PRINCE EDWARD ISLAND NUTRITION SURVEY

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EXECUTIVE SUMMARY

The Prince Edward Island Nutrition Survey is the first province wide survey to be conducted since the 1970's. This report describes nutrient intakes and weight status of adult residents of Prince Edward Island. The results are based on interviews of 1,995 Islanders aged 18 to 74 years, with a 71% response rate.

The diet of the majority of Islanders provides inadequate levels of folate, magnesium, and vitamin C. This suggests that fruit and vegetable consumption needs to be encouraged.

Few Islanders are consuming the recommended level of calcium, especially among men and women over 50 years. This suggests that consumption of low-fat dairy products needs to be encouraged.

The increasing prevalence of inadequate zinc and vitamin B_6 intakes with age suggests a need to increase consumption of food sources of these nutrients, including meats, shellfish and whole grains, especially for Islanders over 50 years of age.

It is important that Islanders reduce fat in their diet, since three quarters of those surveyed consumed more than the recommended fat intake (30% of calories consumed). The high fat intakes may contribute to the high rate of obesity noted: one third of adult Islanders have a Body Mass Index greater than 30. Almost half of adult Islanders had excess fat in their abdominal area, which increases their risk of developing chronic diseases such as heart disease and diabetes.

In contrast to actual dietary intake, the majority of adult Islanders believe that it is very important to them personally to engage in positive health behaviours such as maintaining a healthy weight, choosing a diet with plenty of fruits and vegetables, and choosing a diet that is low in fat.

The results of the PEI Nutrition Survey demonstrate a need for public health interventions designed to improve nutrient intakes and reduce the high rate of obesity in the province. To improve the likelihood of success, these interventions should be part of a comprehensive approach, such as the provincial Chronic Disease Reduction Strategy.

SOMMAIRE

L'Enquête sur la nutrition à l'Île-du-Prince-Édouard est la première à être menée à l'échelle de la province depuis les années 1970. Ce rapport décrit l'ingestion d'éléments nutritifs des résidents adultes de l'Île-du-Prince-Édouard. Les résultats sont fondés sur des entrevues auprès de 1 995 Insulaires âgés entre 18 et 74 ans, et un taux de réponses de 71 pour cent.

Les niveaux d'acide folique, de magnésium et de vitamine C de la majorité des Insulaires sont insuffisants. Cela semble indiquer qu'il est nécessaire d'encourager la consommation de fruits et de légumes.

La majorité des Insulaires consomment moins de calcium que le niveau recommandé, en particulier les hommes et les femmes de plus de 50 ans. Cela porte à croire qu'il faut encourager la consommation des produits laitiers à faible teneur en matière grasse.

La prévalence croissante de l'ingestion inadéquate de zinc et de vitamine B_6 avec l'âge indique, en particulier chez les Insulaires âgés de plus de 50 ans, un besoin d'accroître la consommation des sources de nourriture contenant ces éléments nutritifs, notamment les viandes, les mollusques et crustacés ainsi que les grains entiers.

Les trois quarts des Insulaires consomment plus que l'apport recommandé en matière grasse (30 pour cent des calories consommées). Cela s'inscrit dans la ligne logique du haut taux d'obésité observé : un tiers des Insulaires adultes ont un indice de masse corporelle supérieur à 30.

Contrairement à leur apport alimentaire actuel, la majorité des Insulaires adultes croient qu'il est très important pour eux personnellement d'adopter des comportements de santé positifs tels que le maintien d'un poids-santé, le choix d'un régime alimentaire comprenant beaucoup de fruits et de légumes, et faible en matière grasse.

Les résultats de l'Enquête sur la nutrition à l'Î.-P.-É. démontre un besoin d'interventions en santé publique qui seraient conçues pour améliorer l'apport alimentaire et réduire le taux d'obésité élevé dans la province. Pour augmenter les chances de succès, de telles interventions devraient faire partie d'une perspective globale telle que la Stratégie provinciale de réduction des maladies chroniques.

TABLE OF CONTENTS

Executive Summary i
Sommaire ii

CHAPTER 1 INTRODUCTION 1

- 1.1 Background
- 1.2 Goals
- 1.3 Collaboration and Funding
- 1.4 Acknowledgements

CHAPTER 2 METHODOLOGY 5

- 2.1 Sample
- 2.2 Survey Instruments
  - 2.2.1 24 Hour Recall
  - 2.2.2 Food Frequency
  - 2.2.3 Nutrition and Health Questionnaire
  - 2.2.4 Demographic Profile
  - 2.2.5 Anthropometric Assessment
- 2.3 Data Collection
- 2.4 Quality Control
  - 2.4.1 Interviewer Training
  - 2.4.2 Data Control Forms
  - 2.4.3 Edit Procedures
  - 2.4.4 Tracking Database
  - 2.4.5 Performance Feedback
- 2.5 Data Input
  - 2.5.1 Canadian Dietary Information (CANDI)
  - 2.5.2 Canadian Nutrient File
- 2.6 Statistical Analysis
  - 2.6.1 Demographic and FFQ Data
  - 2.6.2 Mean Nutrient Intake
  - 2.6.3 Usual Nutrient Intake
  - 2.6.4 Other Analyses
- 2.7 Data Interpretation Committee

CHAPTER 3 RESPONSE AND NON-RESPONSE 17

- 3.1 Sample Results
- 3.2 Response Categories
  - 3.2.1 In-scope Rate
  - 3.2.2 Resolved Rate
  - 3.2.3 Refusal Rate
  - 3.2.4 Response Rate
- 3.3 Non-response Questionnaire
- 3.4 Comparison of Responders to Population Profiles
- 3.5 Sampling Weights
- 3.6 Limitations of Survey

CHAPTER 4 DEMOGRAPHIC CHARACTERISTICS 25
- 4.1 Health Region
- 4.2 Age and Sex
- 4.3 Marital Status
- 4.4 Smoking
- 4.5 General Health
- 4.6 Education
- 4.7 Income Adequacy

CHAPTER 5 ENERGY AND NUTRIENT INTAKES 29
- 5.1 Measuring Nutrient Intakes
  - 5.1.1 Differences by Sex
  - 5.1.2 Differences by Age
- 5.2 Sources of Energy Intake
- 5.3 Comparison with Recommended Nutrient Intakes
  - 5.3.1 Macronutrient Recommendations
  - 5.3.2 Micronutrient Recommendations
  - 5.3.3 Fibre
- 5.4 Comparison with Provincial Nutrition Surveys
- 5.5 Comparison with National Canadian Surveys

CHAPTER 6 ENERGY INTAKE AND WEIGHT STATUS 53
- 6.1 Procedures
- 6.2 Body Mass Index
- 6.3 Waist Hip Ratio
- 6.4 Physical Activity
- 6.5 Comparison of Energy Intake to Expenditure
- 6.6 Relationship Between Energy Intake and BMI

CHAPTER 7 FREQUENCY OF FOODS CONSUMED 63
- 7.1 Measuring Food Frequency
- 7.2 Consumption of Vegetables
- 7.3 Consumption of Meat and Alternatives
- 7.4 Consumption of Milk Products
- 7.5 Consumption of Grain Products

CHAPTER 8 NUTRITION AND HEALTH ATTITUDES 71
- 8.1 Health Related Attitudes
- 8.2 Attitudes on Health and Disease Prevention
- 8.3 Perceived Importance of Health Behaviours
- 8.4 Sources of Dietary Information

CHAPTER 9 DISCUSSION 79

CHAPTER 10 CONCLUSIONS 85

REFERENCES 87

APPENDICES 95

A. Survey Instruments 97
B. Training Schedule 125
C. Administrative Data Control Forms 131
D. Tracking Database 141
E. Recommendations for Interpretation 145
F. Non-Response Tables and Forms 147
G. Nutrient Intake Confidence Intervals 155
H. List of Figures, List of Tables 167

1 INTRODUCTION

The Prince Edward Island Nutrition Survey was a province wide survey in 1995 of adult Prince Edward Islanders designed to describe dietary practices and nutrient intakes. A peer reviewed standardized protocol developed for the Nova Scotia Nutrition Survey and used by three other provinces (Quebec, Saskatchewan and Alberta) was used for the study. By 1999, all provinces in Canada had used similar protocols. A sample of approximately 2000 non-institutionalized Islanders, aged 18-74 years, was drawn from the Island Health Information System. Community based health professionals collected the data during in-home interviews. The Bureau of Nutritional Sciences (BNS), Health Canada, provided technical expertise and validated, coded and processed the data.

1.1 BACKGROUND

A large body of both observational and experimental evidence supporting the role of diet in the etiology of chronic disease has accumulated over the past 30 years.

Although deaths from cardiovascular disease (CVD) have been declining in Canada since 1970, it remains as the leading cause of morbidity and mortality for both men and women, accounting for 37% of all deaths in 1996 (Health Canada, 1999b). The Atlantic provinces have had consistently higher mortality rates from cardiovascular disease than other provinces (Heart and Stroke Foundation of Canada, 1997). A number of risk factors for CVD have been identified, including elevated blood cholesterol, smoking, high blood pressure and diabetes. Obesity and inactivity have also been identified as contributing factors. The PEI Heart Health Survey (Department of Health and Social Services, 1989) revealed that two out of three Islanders have one or more risk factors for cardiovascular disease. Modifiable diet related factors were found to be most common, including obesity, elevated blood cholesterol levels and hypertension. The Nutrition Recommendations for Canadians (Health & Welfare Canada, 1990) emphasize that the reduction of saturated fat in the Canadian diet is a key factor in reducing the risk of heart disease. In 2000, the Working Group on Hypercholesterolemia and Other Dyslipidemias (Fodor et al., 2000) also highlighted the importance of a dietary strategy as the preferred approach to the control of dyslipidemia in Canada.

Cancer accounts for 27% of all deaths in Canada (National Cancer Institute of Canada, 1998). The highest death rates for cancer in Canada are in Nova Scotia and Prince Edward Island (Health Canada, 1999b). Dietary factors have also been implicated in the incidence of certain cancers. It has been suggested that 30 to 40% of cancer cases throughout the world are preventable through dietary changes (American Institute for Cancer Research, 1997). For example, observational studies have shown an inverse relationship between the intake of fruits and vegetables known to contain antioxidant vitamins and the risk of several types of cancer (Lee, 1999). In particular, the consumption of 400 grams/day or more of a variety of vegetables and fruit could, by itself, decrease overall cancer risk by as much as 20% (American Institute for Cancer Research, 1997).

Diabetes is also a major health issue in Canada. It is estimated that between 1.2 and 2.2 million Canadians already suffer from diabetes, with 60,000 new cases diagnosed each year (Health Canada, 1999a). It is the seventh leading cause of death in Canada, accounting for at least 5, 500 deaths per year and possibly contributing to as many as 25,000 due to its many complications (Health Canada, 1999a). Nearly 90% of people with diabetes have Type 2 diabetes. They are most often diagnosed after age 40 with obesity being a primary risk factor.

The increasing presence of diet related chronic diseases in the Canadian population make it essential to assess dietary intakes at the population level. Such information is needed to evaluate the extent to which the population is adhering to current dietary recommendations (Krebs-Smith et al, 1997), to identify population groups at increased nutritional risk and to plan health promotion programs designed to reduce dietary risk factors for chronic disease (Lee & Nieman, 1996). However, little data exist on the actual dietary intake of Canadians. The most recent nationwide dietary survey was conducted nearly three decades ago (Health & Welfare Canada, 1973). Therefore, the nutrient intake data may not represent current dietary patterns and are thus no longer valid for use in developing policy and/or program interventions. A more recent survey of five regions in Canada was conducted in 1997-1998 (Gray-Donald et al, 2000). However, there were no respondents included from Prince Edward Island and the overall response rate for the survey was low. To address the need for more recent provincial data, all provinces have completed nutrition surveys using similar protocols during the 1990's. The PEI Nutrition Survey is part of this initiative, and will contribute towards establishing a much needed national data base of dietary intake data. For PEI, the survey of a large random sample of Islanders will provide data essential to design and evaluate health promotion policies and programs. Further, results will provide a basis for monitoring provincial health goals which pertain to nutrition.

1.2 GOALS

The goals of the PEI Nutrition Survey were:

- To assess the food consumption patterns of Islanders, more specifically to estimate the distribution of dietary intakes of macro/micro nutrients;
- To identify groups at risk from a nutritional perspective which would constitute a priority for intervention; and
- To describe attitudes pertaining to nutrition and health.

The original proposal included two additional goals which will be addressed in separate reports:

- To assess the contribution of the major food groups to nutrient intakes and
- To assess the prevalence of food insecurity attributable to inadequate resources among Islanders.

1.3 COLLABORATION AND FUNDING

The project was a federal-provincial collaboration, and funded jointly through the National Health Research and Development Program (NHRDP), the Health Protection Branch of Health Canada, and the Prince Edward Island Department of Health and Social Services.

The PEINS research team was a collaborative partnership between the PEI Department of Health and Social Services and the University of Prince Edward Island.

Members of the PEI Nutrition Survey research team included:

Dr. Lamont Sweet	Principal Investigator
Dr. Jennifer Taylor	Co-Investigator/Quality Control Supervisor
Prof. Debbie MacLellan	Co-Investigator/Survey Manager/Facilitator
Dr. Linda Van Til	Co-Investigator/Epidemiologist
Rosemary White	Co-Investigator/Survey Co-ordinator

1.4 ACKNOWLEDGEMENTS

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- Interviewers, who successfully adhered to a rigorous protocol and worked tirelessly so that we could achieve our sampling objective:

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  Bev Grant
  Joanne Hardwick
  Deanna Heckbert
  Kathy Hollinger
  Anne Kells
  Nancy Kemp
  Roberta Larsen
  Libby Logan
  Ann Marie MacDonald
  Gail MacIssac
  Joan MacPhee
  Alanna MacVittie
  Leona Moran
  Isabel Paynter
  Margaret Prouse
  Verna Roche
  Margaret Weeks
  Dale Wonnacott
  Linda Yorston

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- Finally, the residents of Prince Edward Island, whose generous participation made this survey possible.

2 METHODOLOGY

The PEI Nutrition Survey used a similar protocol to the other provincial nutrition surveys. This chapter describes the methods used by the PEI Nutrition Survey.

2.1 SAMPLE

The target population of the PEI Nutrition Survey were male and female Islanders between the ages of 18 and 74. This age group was selected since the PEI Heart Health Survey (Dept of Health & Social Serv, 1989) revealed a high prevalence of modifiable risk factors in this group. Children and adolescents are recognized as a population that also requires study. However, due to the particular issues involved (e.g. educational context, data interpretation standards), surveying of this group requires a different methodology such as proxy responses that requires a separate protocol. Other persons were not eligible for the study (pregnant, lactating, institutionalized, or living on reserve lands) for unusual dietary needs or not forming a large enough group for separate analysis.

The sampling frame was the PEI Health Registry administered by the PEI Department of Health and Social Services. This includes all PEI residents who are eligible for PEI Medicare coverage. Table 2.1 presents a comparison of population counts using both the sample frame and the census estimate, demonstrating that the counts are within 6%. This demonstrates the successful use since 1970 of PEI's unique lifetime identifier.

Table 2.1 1995 PEI Population Counts, by age-sex strata

Stratum Number	Age-Sex Strata	Sample Frame[1]	Census Estimate[2]
1	Male 18 - 29	11336	11558
2	Male 30 - 39	9988	10662
3	Male 40 - 49	9003	9689
4	Male 50 - 59	5845	6423
5	Male 60 - 69	4528	5030
6	Male 70 - 74	1646	1975
7	Female 18 - 29	10893	11157
8	Female 30 - 39	10443	10947
9	Female 40 - 49	9091	9715
10	Female 50 - 59	5825	6385
11	Female 60 - 69	4774	5261
12	Female 70 - 74	1956	2421
TOTAL		85328	91223

[1] PEI Health Registry, March 29, 1995

[2] 1995 Post Census Estimates, Cansim II, Statistics Canada

Data elements provided by the sample frame included: name, sex, date of birth, health region, address, and phone number. A stratified single-stage random sampling design was used to select the PEI Nutrition Survey sample. A random sample was drawn from twelve age-sex strata (males, females: ages 18-29, 30-39, 40-49,50-59,60-69,70-74). For each season (spring and fall), five replicates were drawn from each stratum. Two of the five were to be used as backup in case the first three did not provide enough respondents for reliable estimation within the required percent. Sampled individuals were systematically assigned to days of the week for their interviews so that all seven days of the week would be covered. Approximately one third of the sample was randomly selected for repeat interviews, to allow for calculation of intra-individual (day-to-day) variation in intakes for the 24 hour recall (Nargundkar, 1995).

The design specified 1,000 interviews per season, or a total of 2,000 persons to be interviewed. To accomplish this, the total sample drawn included 3,467 individuals, to allow for an expected 20% of the addresses to be out of date, and an 80% response by the located persons. The entire drawn sample was tracked, and the results are provided in Chapter 3.

2.2 SURVEY INSTRUMENTS

Four instruments were used in the PEI Nutrition Survey: a 24-hour dietary recall, a food frequency questionnaire, a demographic profile and a "nutrition and health" questionnaire, which assessed health related attitudes. The provincial surveys all used similar survey instruments for the 24 hour recall, the food frequency questionnaire, and the demographic profile. However, the questionnaire on nutrition and health was regarded as optional by the representatives from Health Canada and was not standardized among provinces. All survey instruments were reviewed by an Expert Advisory Committee. Members of this committee included:

Dr. Lamont Sweet, Chief Health Officer, PEI Dept. Health
Dr. Jennifer Taylor, University of PEI
Professor Debbie MacLellan, University of PEI
Dr. Linda Van Til, Epidemiologist, PEI Dept. Health
Rosemary White, Heart Health Co-investigator, PEI Dept. Health
Elizabeth Newson, Specialty Services & Nutrition, PEI Dept. Health
Deborah Keays, Nursing Services Coordinator, PEI Dept. Health

The committee reviewed the survey instruments used in Alberta, Nova Scotia, Quebec and Saskatchewan and advised on modifications needed for use of the survey tools in Prince Edward Island. All changes were sent to Health Canada for review prior to finalization.

2.2.1 24-Hour Recall

The 24-hour recall (Appendix A) conducted in the PEI Nutrition Survey was carried out using an identical methodology and format as in the Nova Scotia Nutrition Survey. This method requires respondents to recall their food intake during the previous 24 hour period (Gibson, 1990). The 24-hour recall is the primary method used in population based dietary surveys because of its ability to provide valid estimates of average nutrient intakes of large groups for relatively low cost and low respondent burden (Thompson & Byers, 1994). PEI interviewers utilized food model kits, used in the Alberta Nutrition Survey, which allowed them to ask participants to assess portion sizes of all foods consumed over the previous 24-hour period. Portion-size models were developed to facilitate the respondent's description and the interviewer's understanding of the amount of each food eaten. Where known, the actual weights of foods were recorded. The multiple pass method (Guenther et al, 1996) was used to ensure accurate and complete data. With this method, interviewers first asked respondents to remember and identify the foods that they had eaten during the previous 24-hour period. During the second pass, respondents were asked to provide specific details on foods and amounts, cooking methods, brand names of foods, whether foods were consumed from commercial outlets and the time foods were consumed. This provided respondents with an opportunity to recall food items initially forgotten. Recipes were requested and used wherever possible. Where dishes were prepared according to regional or cultural traditions of the respondents, these were identified and described. The interviewers reviewed and probed for any missing information on foods or forgotten foods during the third and final pass.

2.2.2 Food Frequency

Food Frequency Questionnaires (FFQs) are used to collect information about the respondent's usual long term dietary intake (Thompson & Byers, 1994). The FFQ used by PEI (Appendix A) was similar to that used in Nova Scotia and Alberta and was administered by the interviewer immediately after the 24-Hour Recall was completed. Respondents were asked to describe the frequency of consumption (daily, weekly or monthly) of 43 food items. Many foods were selected because they are major contributors to fat intake. Additional questions assessed the use of fats and oils in food preparation, cooking methods, and homemade foods. The final section of the questionnaire required respondents to indicate if they were choosing or avoiding certain foods for health reasons. The instrument is described in more detail in Chapter 7.

2.2.3 Nutrition And Health Questionnaire

The Nutrition and Health Questionnaire (Appendix A) was designed to find out about the respondents' general health, as well as their attitudes towards nutrition and health in general. The questionnaire assessed the respondent's general health (perceived), exercise, smoking and dieting behaviours and whether or not they thought certain actions can prevent heart disease. It also provided information on what sources respondents used to obtain information on diet and health, how important eating a healthy diet was to them. The nature of and sources of attitudinal questions are discussed in Chapter 8. Finally, a total of nine items pertaining to individual and household food insecurity were included in the instrument. These were adapted from those developed for the Third National Health and Nutrition Examination Survey (Briefel & Woteki, 1992). Results of the assessment of food insecurity will be included in a separate report.

Once items were identified, the Nutrition and Health questionnaire was reviewed by the Expert Advisory Committee and pretested among 31 adults in the Charlottetown and Summerside area. The pilot test was conducted by a dietetic intern and two UPEI Foods and Nutrition Students prior to the survey. Respondents were asked to comment on problems with question wording and comprehension and any concerns pertaining to sensitivity of the food insecurity questions. The only adaptation following the pilot was the addition of prompt cards for the responses to the attitudinal questions to facilitate questionnaire administration.

2.2.4 Demographic Profile

The Demographic Profile Form (Appendix A) included questions about marital status, education, and household income. Details regarding the source and nature of these questions are included in Chapter 4.

2.2.5 Anthropometric Assessment

In addition to the instruments described above, an anthropometric assessment was also conducted with each respondent. Measures included body weight, standing height and waist and hip circumferences. Anthropometric procedures are described in more detail in Chapter 6.

2.3 DATA COLLECTION

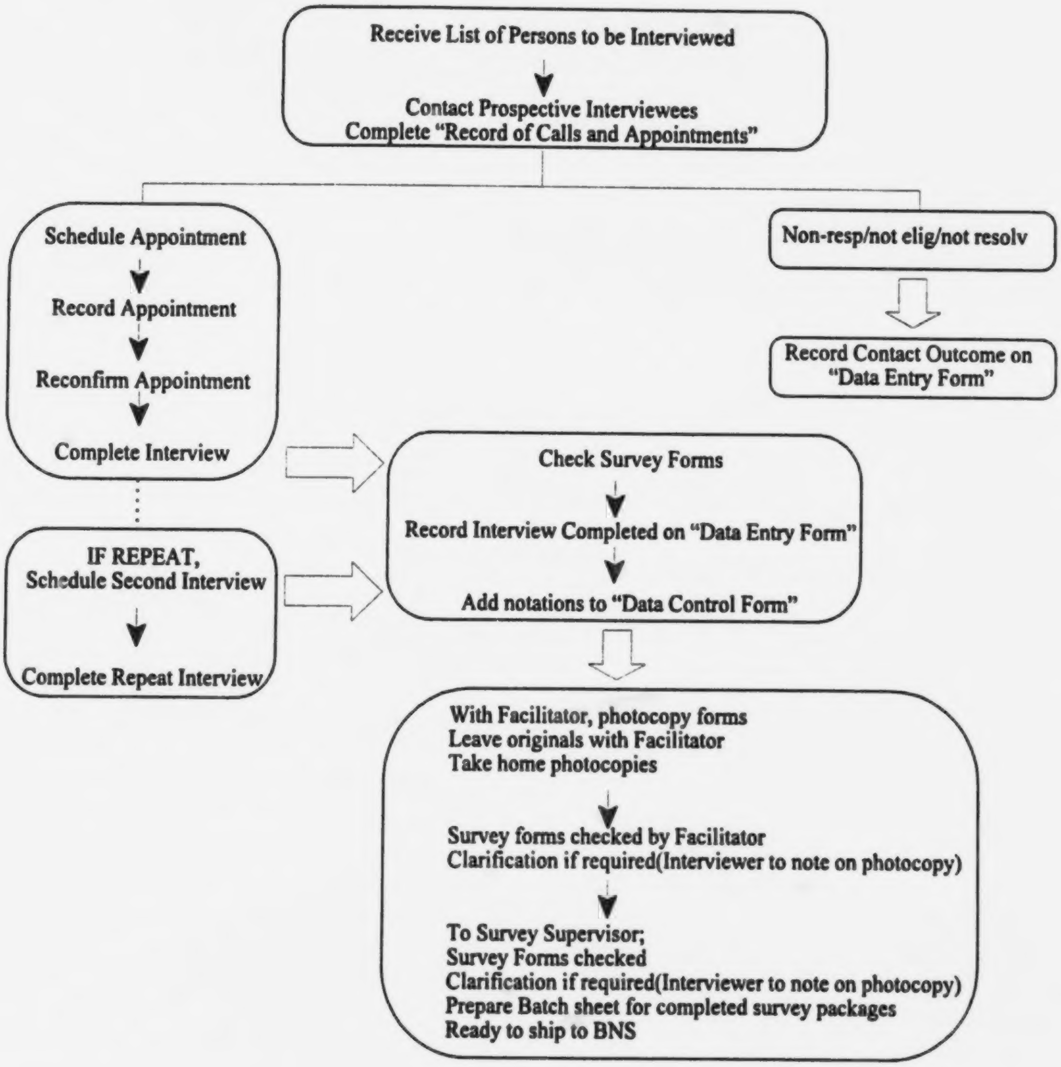
Shortly before the survey began in each season, prospective respondents were sent a letter signed by the principal investigators indicating that they had been selected for the survey and encouraging them to participate. A joint press release about the upcoming survey was developed by the PEI Advisory Committee and submitted to the media prior to the beginning of data collection. Half the interviews were completed in the spring (April 1 to June 30, 1995), and the other half in the fall (September 18 to December 16, 1995).

Prospective participants were telephoned by one of the interviewers and the intent of the survey explained, participation requested, and a date was arranged for a home visit. Five or more attempts were made to contact each individual on different days of the week and at various times of the day. Current telephone numbers were supplied by the local telephone company, Island Tel, but in many cases the interviewers needed to investigate several local sources to locate prospective participants. All prospective participants in a replicate were assigned to an interviewer, based on health region. This facilitated tracking of surveys. Interviews were arranged, as far as possible, for the day assigned to each selected individual. However, it was considered more important to obtain an interview for any day than to restrict interviewers only to the assigned days.

All contact attempts were recorded, and five attempts at different times were required before assigning an "unresolved" status to the interview. Interviews were conducted in the home, but a few interviews were curtailed by the interviewer if the home situation was deemed unsafe. Before leaving the home, interviewers reviewed the 24 hour recall form. If an assigned individual was contacted but refused, reasons for refusal were noted and the Non-Response Form (Form A-2) completed to determine if refusals had different eating patterns (bread, milk) than people who participated.

Completed interviews were reviewed several times (Quality Control), and accompanying administrative forms were entered in the study computer. Photocopies of all survey instruments were maintained by interviewers, then stored at University of PEI before originals were couriered to Ottawa for data input. The flow of interview information is described in Figure 2.1.

Figure 2.1 Survey Data Flow


Receive List of Persons to be Interviewed
Contact Prospective Interviewees
Complete "Record of Calls and Appointments"
Schedule Appointment
Record Appointment
Reconfirm Appointment
Complete Interview
Non-resp/not elig/not resolv
Record Contact Outcome on "Data Entry Form"
Check Survey Forms
Record Interview Completed on "Data Entry Form"
Add notations to "Data Control Form"
IF REPEAT, Schedule Second Interview
Complete Repeat Interview
With Facilitator, photocopy forms
Leave originals with Facilitator
Take home photocopies
Survey forms checked by Facilitator
Clarification if required(Interviewer to note on photocopy)
To Survey Supervisor;
Survey Forms checked
Clarification if required(Interviewer to note on photocopy)
Prepare Batch sheet for completed survey packages
Ready to ship to BNS

2.4 QUALITY CONTROL

2.4.1 Interviewer Training

Twenty-three interviewers (community based health professionals) were trained during a ten-day intensive training session prior to the first phase of data collection. The session was conducted by two nutrition experts experienced in the execution of nutrition surveys (Danielle Brulé and Theresa Riege) and two co-investigators (Jennifer Taylor and Debbie MacLellan).

The primary objectives of the training were to ensure accurate recording of food data, consistency in interviewing techniques, confidentiality, and adherence to survey protocol. The training schedule is found in Appendix B.

The Interviewers' Resource and Training Manual (adapted from the Alberta Nutrition Survey Manual) was used as the basis for training and as a reference when administering questionnaires during data collection. Interviewers were instructed in the methods of completion of both the survey forms and the administrative forms. Training included practice exercises, viewing taped interviews, and performing mock interviews. Each interviewer was evaluated in the capture and appropriate recording of dietary information at the end of the training session.

A two-day retraining session for all survey personnel was held prior to the start-up of the second season of data collection to ensure maintenance of a consistent skill level. Success of the hiring and training program was depicted by the lack of interviewer turnover: no new interviewers were required for the second season.

2.4.2 Data Control Forms

Several administrative forms were used to ensure data quality:

1. Contact Sheet and Record of Calls
2. Data Entry Form A-1
3. Progress Tally Sheet
4. Data Control Form

A Contact Sheet (Appendix C) was provided for each prospective participant, with a computer generated label with name, address, and phone to begin contact. It was used to provide the interviewer with the information needed to contact the potential respondent, and to seek more detailed information to assist in future follow-up. Corrected information was added to the form. All attempts made to contact the potential respondent by telephone or in person to arrange an appointment were recorded on the back of this form along with the date and the time called.

The "Data Entry Form A-1" (Appendix C) accompanied every survey package to its data entry destination. It was used to track respondents and incorporate necessary quality control checks. If an interview was not attained, the reason was coded to one of three categories: non-response, unresolved, or not eligible. Non-response required contact with either the respondent, or a close family member. These included refusals, no shows, not available, or could not speak the language. Unresolved were the result of an out-dated list from the sample frame. The dead end could be with the address, the phone, or a visit with the neighbours. Not eligible persons could not be interviewed according to the protocol. These included dead (due to an outdated sample frame), pregnant or nursing women, moved out-of-province, hospitalized, or institutionalized persons.

The interviewer's Progress Tally Sheet (Appendix C) listed all prospective participants assigned to each interviewer, and the most current contact status (attempted, appointment made, interview conducted, no interview, assigned to another interviewer). Once a week, each interviewer faxed the most current summary to UPEI, to facilitate calculation of the need to assign another replicate.

The Data Control Form (Appendix C) was used to track the completed survey packages from the initial response/non-response review processes to final forwarding to Ottawa. The interviewer listed the identification of all completed interviews, and all completed contacts without an interview. This form accompanied each bundle of completed interviews that was handed over to the facilitator.

2.4.3 Edit Procedures

Four facilitators were responsible for review of each survey package. They reviewed information on the Contact Sheet to verify the final status of each respondent as indicated on both the Data Entry Form A-1, and the Data Control Form. Details recorded on the 24 Hour Recall were carefully examined for completeness and coding. Facilitators communicated directly with interviewers (who maintained survey photocopies) regarding problems and changes.

The quality control supervisor was responsible for the data flow and quality control during the survey, providing another edit of the survey forms. Both facilitator and supervisor indicated their reviews on the Data Control Form. Close contact was maintained between the quality control supervisor, the facilitators and interviewers.

All completed survey forms were reviewed twice to assure quality before the forms were forwarded to the quality control supervisor, first by the interviewer at the participant's home and at the interviewer's office or home, and second, by the facilitator. If the facilitator noted missing information, or inadequate description of items consumed, she would call the interviewer to obtain the information. The interviewer, in turn, would call the respondent for this information and the record would be amended. The facilitator would then pass on the record to the Quality Control Supervisor (QCS), who would examine the record again. If the QCS noted missing information or inadequate description of items consumed, she would pass the form back to the facilitator who was responsible for obtaining the information, if possible, from the interviewer. The QCS would then send it to the Bureau of Nutritional Sciences (BNS) in Ottawa.

At the BNS, batch sheets, sent by fax to ensure that all courier deliveries are intact, were compared with survey packages as received, to confirm that all records arrived. Basic identifying data entered in PEI were confirmed and, if required, inconsistencies clarified, and additional information entered relating to data management in Ottawa. A cumulative record of the status of all forms at either location was thus continuously available.

2.4.4 Tracking Database

A computer program (described in Appendix D) was developed by the epidemiologist on the research team, and used to manage and track survey forms and identify data on each individual selected for the survey. The program was used to prepare, on an on-going basis, tabulations of responses and non-responses to monitor weekly progress. Weekly progress reports provided information by interviewer on: number of assigned names not attempted, number of completed first interviews, % of interviews completed on the assigned day, number of refusals, non-response rate, not-resolved rate, not eligible rate, and repeat interview refusal rate.

2.4.5 Performance Feedback

The editing process described above resulted in immediate verbal feedback to interviewers from the facilitators. A more formal process for feedback involved weekly meetings of the Data Quality Committee, where the quality control supervisor, epidemiologist, and facilitators met to discuss the results from the forms, editing, and tracking database progress reports. The interviewer-specific statistics and edits were used by the facilitators at their next meeting with each interviewer. The quality control supervisor and one of the facilitators (Nancy Taylor) then produced a newsletter "Bits and Bytes" distributed to all interviewers. This provided a printed vehicle to describe progress of the total survey, encourage improvements in response rates, to define common coding rules discovered during edits, and communicate with the survey team.

2.5 DATA INPUT

The most time consuming methodology in this survey was the data input. All questionnaires were at the BNS by January 1996; data input was completed by March 2000. Data from all forms, except the 24-hour recall, were entered twice, with immediate on-screen feedback of inconsistencies which required correction before further entries were made. 24 Hour Recalls were checked again to ensure the level of detail was compatible with the food descriptions in the Canadian Nutrient File. Data recorded on the survey forms were entered into CANDI by experienced data clerks familiar with food descriptions, who receive training on the specifics of the survey, and were supervised by professional staff to ensure data quality. Data entry of 24-hour recall data was interactive, beginning with entry of a key name for a food, then requiring selection of the exact or best match to the food or mixed dish from the many options displayed on the screen. Existing computerized recipes were used for mixed dishes, with ingredient substitutions or the addition of new recipes. Quantities consumed were entered by weight, volume or coded portion-size model. Nutrient supplement data was entered by the Drug Identification Number (DIN) or by the name and/or nutrient content if a DIN is not available.

Problems and questions related to recorded data that were identified during data entry were relayed to PEI for clarification or correction before data entry was completed.

Professional staff at the BNS made a final manual data input check by comparing a printed copy of each individual's computer recorded data with the information on the original field form. All errors were immediately corrected and the final report filed.

2.5.1 Canadian Dietary Information (CANDI)

CANDI is a custom-designed software programme, developed by research staff at the BNS to facilitate the entry, processing, storage and retrieval of data on the nutrient composition of foods from the 24-hour recall. The system is designed to be flexible for both input and output. Individual foods, meals, recipes, one-day or several-day records can be entered. Examples of information that can be obtained from the data include the frequency of intake of all foods, of one food, or of one food group and the nutrient intakes for individuals or for user-defined physiological, demographic or socio-economic groups within survey populations. The system is flexible and user-friendly but maximum efficiency demands that survey methodologies and form lay-out are designed in close collaboration with those who can "tailor-make" the system for specific applications.

Custom-designed displays are used in the entry of data from pre-coded survey forms such as the food frequency questionnaire. An automatic checking system was built in to ensure a certain degree of consistency and data quality in questionnaires like the FFQ and the nutrition & health questionnaire. This system requires that such questionnaires be entered twice to check for inaccuracy. Entry of data from the 24 hour recalls is done once by the clerks but every recall is checked by trained dietitians/nutritionists to ensure data quality. The 24 hour recalls that need correction are sent back to the clerks for revision. CANDI uses several databases of foods, mainly the Canadian Nutrient File (Health Canada, 1991) and a recipe database of nearly 3000 recipes, adapted from the USDA CSFII recipe database. New foods and new recipes can be included in this data entry system. Recorded details on foods and recipes can be captured to tailor exactly what the participant had; so ingredients in a recipe and their quantities can be changed to match the food items described on the 24 hour recall form. Amounts consumed are entered as weight or volume but every volumetric measure must be converted into a gram weight for the output analysis. Using these weights, CANDI calculates the nutrients provided in each food as it is entered into the system for immediate display but it can also stored the complete information.

2.5.2 Canadian Nutrient File

The Canadian Nutrient File (CNF) is a computerized data base, compiled at the BNS, on the nutrient values of foods (Dept. National Health and Welfare, 1991). The primary source of the data is the extensive revisions of the U.S. Department of Agriculture's Agriculture Handbook No. 8 (USDA, 1976-1986), adapted to reflect the Canadian food supply, enrichment and marketing practices in Canada. The CNF is continuously updated to include new and revised food composition data as they become available in Canada and from the USDA, with subsequent versions produced in 1991, 1997, and 2001. The 1991 version of the CNF was used to analyse the PEI Nutrition Survey data.

The file contains data on up to 98 nutrients in 3909 basic foods. The descriptors used to define foods in the CNF dictate the level of detail that must be recorded on the survey forms completed in the field. Information that will allow close matching of foods requires that interviewers are familiar with the types of options available.

2.6 STATISTICAL ANALYSIS

Following data input by the Nutrition Research Division, Food Directorate, Health Canada, the data were transferred from CANDI to files for the statistical software SAS by Bureau of Biostatistics and Computer Applications (BBCA), Food Directorate, Health Canada. BBCA used SUDAAN for estimating variances from complex surveys in conjunction with SAS v.6 for the analysis. Additional analyses were conducted in PEI using STATA v.6 to incorporate sample weights, sample design, and the pooled age-sex strata, in conjunction with SAS v.6. Failure to deal with these design issues would produce under-estimates of the sample variance.

2.6.1 Demographic and FFQ Data

All means, proportions, and confidence intervals for these estimates were calculated taking into account both the sample weights and the sample design (Chapter 3). BBCA provided an example of these calculations with a table showing the population proportion with categories of BMI (Junkins et al, 2001b). Additional analysis were conducted in PEI.

2.6.2 Mean Nutrient Intake

Calculation of population means for nutrient intakes used the initial 24-hour recalls. These data include both variability between individuals (inter-subject variation) and day to day variability for each individual (intra-subject variation) (Beaton et al, 1983). BBCA provided mean nutrient intakes and nutrient intakes as a proportion of caloric intake by the pooled age-sex strata (Junkins et al, 2001b), using standard analytical procedures. Additional analyses were conducted in PEI.

2.6.3 Usual Nutrient Intake

As mentioned above, the 24-hour recall data includes the presence of two components of variance: inter-subject and intra-subject. As a result, descriptions of usual intake using only single day assessments provides distributions with longer tails, and exaggerates the extremes of intake distribution (Beaton et al, 1979).

Therefore, estimates of usual intake require methodology that utilizes both the initial and repeat 24-hour recalls. A two-step process was used (Junkins et al, 2001a):

- the distribution was examined for a normalizing transformation after removal of outliers (0.83% of PEI's data);
- Taylor linearization to remove calculated intra-individual variability, using a repeated measures model of the transformed nutrients, including age, sex, and season as fixed effects in a hierarchical model.

The results of adjusting for usual intake provided a distribution with the same shape and median as the original variable, but the tails on either side were reduced (Junkins 2001a). This is demonstrated by the graphs in Figures 2.2, 2.3, 2.4.

Figure 2.2 Caloric Intake from Energy: PEI Observed vs. Adjusted

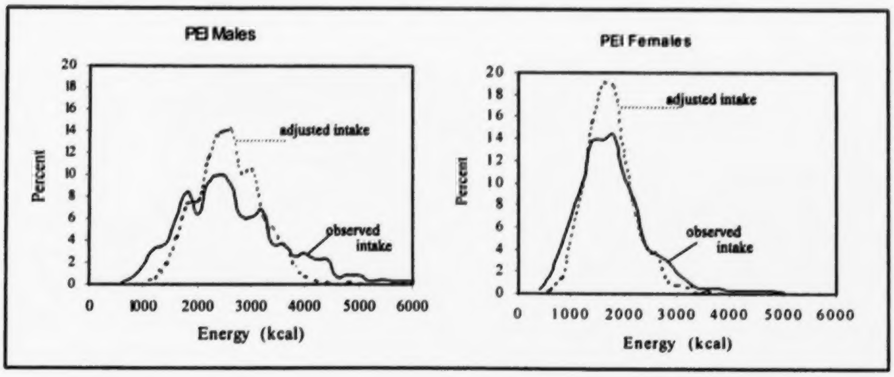


Figure 2.3 Carbohydrate Intake: PEI Observed vs. Adjusted

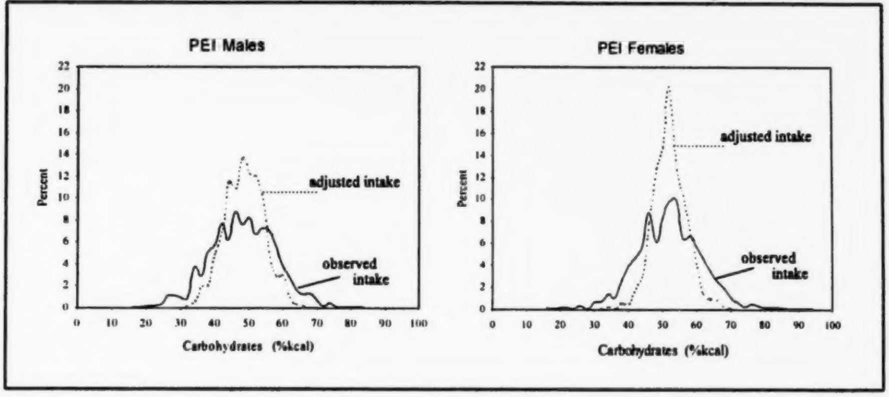
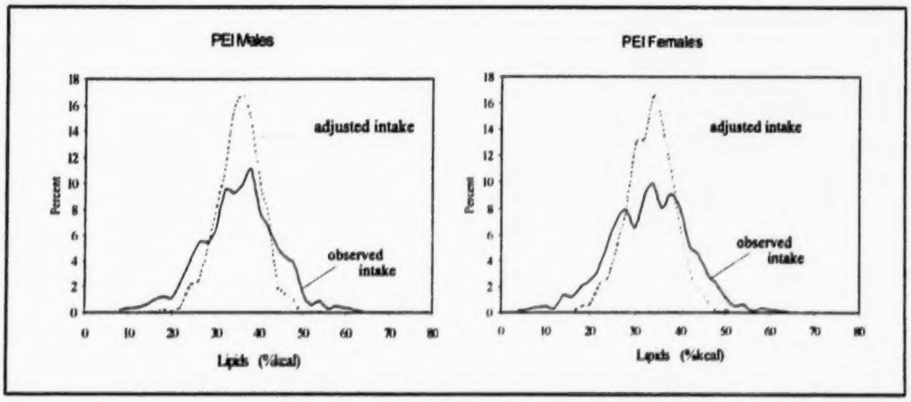


Figure 2.4 Lipid Intake: PEI Observed vs. Adjusted



Several tables in this report used adjusted intakes, when appropriate: estimates of the proportion of the population who usually consume above (or below) a specific cut-point would be overestimated using single day intake. All tables in this report using adjusted intakes are labelled as "adjusted for intrasubject variability". These include the nutrient percentiles, categories of macronutrient consumption, and dietary reference intakes. These tables were produced by BBCA and variances estimated using SUDAAN (Junkins et al, 2001b). The adjusted data cannot be used to estimate an individual's usual intake.

Alcohol and caffeine could not be adjusted for usual intake because of the extreme shape of their distributions; large numbers of study subjects did not consume them at all.

2.6.4 Other Analyses

The data bases generated from this survey can be used for in depth analyses of inter-relationships between variables, nutrients, provenances and various other concerns related to health and nutrition. Analysts are cautioned that failure to account for the design might seriously underestimate the sampling error, and contribute to erroneous conclusions when comparing subgroups.

2.7 DATA INTERPRETATION COMMITTEE

Prior to publication, each provincial survey is subject to review by a panel of experts. On March 26-27, 2002, the committee met in Prince Edward Island with the following members:

Dr. Valerie Tarasuk, Chair	Associate Professor, Department of Nutritional Sciences, University of Toronto
Dr. Susan Whiting	Associate Professor, Division of Nutrition and Dietetics, University of Saskatchewan
Krista Esslinger	Office of Nutrition Policy and Promotion, Health Canada
Dr. Walid Aldoori	Medical Director, Nutritionals, Whitehall-Robbins Inc.

The peer review process provided detailed comments that are incorporated in this report, and the following summary:

> "The Prince Edward Island Nutrition Survey is a very important piece of work documenting the dietary intakes of adult residents of Prince Edward Island. The survey was well executed, as evidenced by the excellent response rate and completeness of the data collected. The results of this survey lay the essential foundation for public health programming."

The committee also provided a list of general recommendations (see Appendix E) for the interpretation of survey results that will be useful for other provinces following a similar protocol.

3 RESPONSE AND NON-RESPONSE

Non-response is a source of potential bias in all survey results. Bias systematically distorts results so that they depart from the truth. Bias can be introduced for many reasons including non-response as well as flaws in the sample frame, the selection methodology, or the recall of past experience (Last 1995). A detailed analysis of response/non-response issues was conducted by the Bureau of Biostatistics and Computer Applications (BBCA) in the Food Directorate of Health Canada, and is extensively referenced in this chapter. Since the persons who did not respond to the survey may be systematically different from the responding population, this chapter will assess the magnitude and direction of bias that may be present in the PEI Nutrition Survey.

3.1 SAMPLE RESULTS

The sample design for the PEI Nutrition Survey was a stratified random sample with 12 age-sex strata; one in three were systematically assigned to repeat interviews (Nargundkar, 1995). The sample was randomly allocated to 2 seasons and 5 replicates per season; there was no stratification by the five health regions. The designed sample of 2000 responses would provide reliable provincial estimates of prevalence (assuming 15% of population with characteristics) within 10%, 19 times out of 20 (Nargundkar, 1995).

The results of this design are displayed in Table 3.1. In total, 1,995 Islanders completed first interviews, consistent with the sample design. To be counted as a completed first interview, protocol required completion of both the 24-hour recall and the food frequency questionnaire, and required the data collected to be detailed and reliable, as judged by the BNS. Only four initial surveys were deemed not useable.

The original sampling plan was designed so that there would be repeat 24-hour recalls for approximately one-third of the individuals; there were repeats for 29% [575/1995] of the participants. As the result of assigning repeat interviews before participants were identified, the repeats were not evenly distributed among each of the age-sex strata. Within each age-sex stratum, random sampling did not always provide an even distribution of ages. This was most apparent in the age group 18-29, where there was a paucity of younger people under 20 selected. Since the drawn sample was not stratified by health region, there was imperfect geographic distribution across each stratum (Weston, 2000).

M121

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Table 3.1 Results of Sampling by Age-Sex Group, Both Seasons

Age-sex group	PEI Total Sample Design	PEI Total First Interviews	PEI Total Repeats	Spring 1995 First Interviews	Spring 1995 Repeats	Fall 1995 First Interviews	Fall 1995 Repeats
Males 18-29	181	178	44	74	12	104	32
Males 30-39	181	185	56	86	28	99	28
Males 40-49	181	173	49	89	22	84	27
Males 50-59	181	188	60	91	31	97	29
Males 60-69	181	178	49	102	34	76	15
Males 70-74	95	98	26	45	10	53	16
Females 18-29	181	173	47	87	24	86	23
Females 30-39	181	184	56	96	27	88	29
Females 40-49	181	179	45	110	26	69	19
Females 50-59	181	184	57	105	34	79	23
Females 60-69	181	187	62	85	25	102	37
Females 70-74	95	88	24	48	16	40	8
TOTAL	2000	1995	575	1018	289	977	286

Source: BBCA 451311-007NR

The objective of the original sampling plan was that the 24-hour recalls would be evenly distributed across days of the week, with 14.3% of interviews taking place on each of the seven days. Table 3.2 displays the actual distribution. Recall for food intake on Saturday is under-represented as a result of many respondents' unwillingness to be interviewed on Sunday. The same pattern was noted in other provinces (Saturday intake was 9% of interviews in Quebec and Saskatchewan).

Table 3.2 Distribution of Interviews by Day of Week

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
First Interview	%	16%	18%	17%	15%	14%	12%	8%
	n	312	368	338	304	278	238	160
Repeat Interview	%	17%	17%	15%	19%	13%	12%	8%
	n	94	95	84	110	78	70	44

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Age-sex group	PEI Total			Spring 1995		Fall 1995	
	Sample Design	First Interviews	Repeats	First Interviews	Repeats	First Interviews	Repeats
Males 18-29	181	178	44	74	12	104	32
Males 30-39	181	185	56	86	28	99	28
Males 40-49	181	173	49	89	22	84	27
Males 50-59	181	188	60	91	31	97	29
Males 60-69	181	178	49	102	34	76	15
Males 70-74	95	98	26	45	10	53	16
Females 18-29	181	173	47	87	24	86	23
Females 30-39	181	184	56	96	27	88	29
Females 40-49	181	179	45	110	26	69	19
Females 50-59	181	184	57	105	34	79	23
Females 60-69	181	187	62	85	25	102	37
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	n	94	95	84	110	78	70	44

3.2 RESPONSE CATEGORIES

Every individual in the drawn sample was assigned a response category using Form A-1 (Appendix C) to characterize their response or non-response, as defined by Statistics Canada (Stat Can, 1992). The tracking system used by the PEI Nutrition Survey (see Appendix D) ensured that 100% of the drawn sample (n=3,467) was attempted to minimize sampling bias. Additional information on response categories are provided in Appendix F, including a flow chart description and counts by age-sex groups.

3.2.1 In-scope Rate

Individuals were considered out of scope (not eligible for the survey) if they were dead, pregnant, nursing, hospitalized, fasting as a requirement for a medical procedure, moved out of province, or lived in an institution or on a reserve (Stat Can, 1992). Almost half (45%) of the out of scope individuals had moved to another province.

Of the individuals who were located and contacted, 90% were within the scope of the survey. In-scope rates were similar for males and females and fell below 80% only for the youngest age group, which includes females of child-bearing age and transient youth (Weston, 2000).

3.2.2 Resolved Rate

Individuals provided by the drawn sample were considered unresolved if they (a) moved within the province but were not tracked down further, or (b) were "no contacts" after follow-up with at least 5 attempts to contact by phone or home visit (Stat Can, 1992). In PEI, all in-province moves were assigned to another interviewer, and facilitators ensured follow-up required at least 5 attempts before acceptance. The no contacts were the result of either out-of-date contact information, or persons rarely home and living alone.

Of those people whose names were drawn for the PEI nutrition survey, 89% were located and contacted (resolved). With few exceptions, when age-sex groups were considered, the resolved rates for males were greater than for females (Weston, 2000).

3.2.3 Refusal Rate

Of the in-scope individuals, only 23% refused to participate in the survey, both spring and fall. The refusal rate was higher for males than females younger than age 60, but greater for older females. The refusal rate improved from 25% in the spring to 21% in the fall (Weston, 2000).

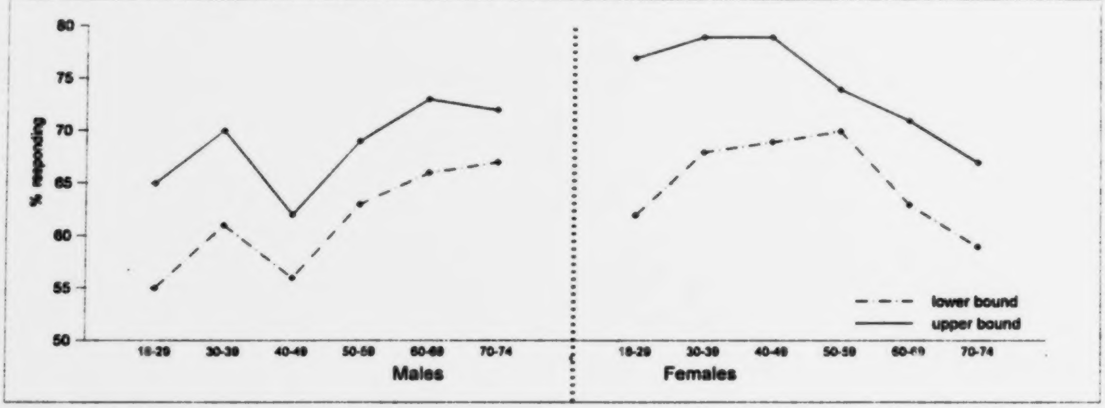
3.2.4 Response Rate

Individuals were considered as non-responders if they (a) refused directly or indirectly, (b) were "no contacts" where the interviewer verified the eligibility indirectly, (c) residual reasons such as language, unsafe conditions, or sibling completed the interview, or (d) the 24-hour recall was deemed incomplete/unreliable/unusable (Stat Can, 1992). In PEI, 80% of non-response were refusals, and 16% were no contacts. Only 4 surveys were deemed not useable. The effort of PEI interviewers to locate individuals resulted in identification of non-responding "no contacts" that in most surveys remain as unresolved.

The trade-off between a high resolved rate or a high response rate must be considered when comparing response rates across provinces.

The overall response rate for the PEI Nutrition Survey was 71%. This value is based on usable first interviews provided by the in-scope individuals, and the assumption that all unresolved cases were not eligible (upper bound of response rate). The least optimistic assumption that all unresolved cases are in scope produces the 63% lower bound to the response rate (Weston, 2000). Figure 3.1 shows response rates by stratum. The response rate was greater for females than males except for the oldest age groups.

Figure 3.1 Response Rates by Age and Sex



3.3 NON-RESPONSE QUESTIONNAIRE

In an attempt to quantify potential differences between participants and those who refused to participate, a few short questions were asked of everyone. The questions on smoking practices, and bread, milk and supplement consumption are found in Appendix E.

Of those people who refused to participate, approximately 62% agreed to answer the non-response questionnaire. Unfortunately, the problem of non-response also plagues these extra questions which make it difficult to make conclusions on the comparability of the two populations.

Compared to the refusers who answered the non-response questionnaire, responders were just as likely to consume white bread, less likely to be daily smokers, more likely to consume lower fat milks and to use supplements (see Table F.4, Appendix F). It is not possible to estimate the magnitude of bias due to those who refused to answer the non-response questions, and it is possible that they may create additional bias, or change the magnitude and apparent direction of the bias' suggested above.

3.4 COMPARISON OF RESPONDERS TO POPULATION PROFILES

The ability of responders to represent the general PEI population can be evaluated using characteristics found in other population profiles. The characteristics examined that are available and relevant to dietary habits are smoking, marital status, and education. For smoking, both the PEI Nutrition Survey and the 1994-95 National Population Health Survey (Stat Can, 1995) used similar questions to determine the status of daily smoker. For marital status, both the PEI Nutrition Survey and the 1996 Census (Stat Can, 1996) used the following categories:

- married (and not separated), or living common law
- single (never married)
- separated/divorced
- widowed

For education, both the PEI Nutrition Survey and the 1996 Census used detailed categories that are susceptible to misclassification. This analysis used the easiest category to clarify: completed a university degree (bachelors degree or higher).

Table 3.3 presents comparisons between the PEI Nutrition Survey and other population profiles for the characteristics of smoking, marital status, and education. To facilitate comparison, all proportions were weighted with respect to age and sex.

Table 3.3 1995 PEI Population Profile, by age and sex

	Males						Females					
	18-29y	30-39y	40-49y	50-59y	60-69y	70-74y	18-29y	30-39y	40-49y	50-59y	60-69y	70-74y
Proportion Daily Smokers:												
PEI Nutrition Survey	0.35	0.39	0.30	0.24	0.27	0.19	0.26	0.28	0.23	0.23	0.12	0.09
PEI Population[1]	0.43	0.52	0.41	0.44	0.23	0.19	0.23	0.23	0.23	0.34	0.13	0.03
Proportion Married:												
PEI Nutrition Survey	0.24	0.75	0.85	0.89	0.82	0.70	0.46	0.84	0.79	0.84	0.66	0.48
PEI Population[2]	0.29	0.72	0.70	0.75	0.62	0.48	0.21	0.68	0.76	0.78	0.74	0.77
Proportion with Bachelors degree or higher:												
PEI Nutrition Survey	0.11	0.09	0.21	0.12	0.10	0.04	0.20	0.10	0.17	0.07	0.06	0.08
PEI Population[2]	0.17	0.14	0.11	0.10	0.05	0.01	0.11	0.11	0.19	0.14	0.06	0.04

[1] PEI NPHS results, 1994/95

[2] PEI 1996 Census (2% sample)

Source: BBCA 451311-007NR

The PEI Nutrition Survey sample may under-represent male daily smokers compared to the general population of PEI. Compared to nonsmokers, smokers are less likely to meet recommended intakes of food and nutrients (Subar, 1990; McPhillips, 1994). This may contribute to bias in the dietary and attitude results, and in the extremes of the intake distributions. However, means and medians are likely to be quite robust to these biases.

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The PEI Nutrition Survey may over-represent married persons in some age-sex groups such as older men, and under-represent in others such as older women. This may introduce bias when analysing data for subgroups. However, the direction of the bias is not consistent and overall may be difficult to detect in the survey.

The PEI Nutrition Survey may over-represent university education in the oldest age-sex groups, and under-represent education in others such as young men. This may introduce bias in the results of the attitude questions, especially when subgroups are examined. However, the small magnitude of the bias and the lack of a consistent trend likely make the bias difficult to detect overall.

3.5 SAMPLING WEIGHTS

Sample weights are used during analysis of survey data to ensure that estimates accurately reflect population parameters. Sample weights account for probabilities of selection, non-response rates, and over/under representation in the sampling frame.

BBCA implemented the formulae for calculating the sampling weights as provided by Statistics Canada. The weights use the 1995 post census population estimates for PEI, and take into account the number of respondents, age, sex, and season (Bilocq, 1999).

Table 3.4 summarizes the calculated weights. Extreme sample weights can distort estimates by giving undue influence to a few unusual observations. Since all sample weights for the PEI Nutrition Survey were below 2 and considered stable, trimming of problematic data was not necessary (Weston, 2000).

Table 3.4 Sampling Weights, By Season

Age-Sex Group	Spring		Fall	
	Population Weight[1]	Sample Weight	Population Weight[1]	Sample Weight
Males 18-29	80	1.74	54	1.19
Males 30-39	63	1.38	53	1.15
Males 40-49	56	1.21	56	1.24
Males 50-59	36	0.79	32	0.71
Males 60-69	25	0.55	32	0.71
Males 70-74	22	0.49	18	0.4
Females 18-29	65	1.43	64	1.39
Females 30-39	58	1.27	61	1.33
Females 40-49	45	0.99	69	1.51
Females 50-59	31	0.68	40	0.87
Females 60-69	32	0.69	25	0.55
Females 70-74	26	0.56	30	0.65

Source: BBCA 451311-007NR

[1] Sum of the population weights for respondents totals the PEI population.

3.6 LIMITATIONS OF SURVEY

The PEI Nutrition Survey had a 71% response rate (of located and eligible individuals), which compares favourably with response rates from other Federal-Provincial nutrition surveys (Weston, 2000).

However, all response rates introduce non-response bias which may systematically distort the results of the survey. Exploration of the possibility that the respondents may not be representative of the general PEI population resulted in identification of a potential bias toward improved nutritional intake suggested by under-representation of smokers. However, the population characteristics examined did not demonstrate a systematic bias for all strata. This suggests that the effect of non-response is minimal for the PEI Nutrition Survey.

Mitigation of the effect of non-response used two major techniques. Weights were developed to re-orient survey data towards the population age-sex profile. Data was combined to create larger strata, with the pooled groups demonstrating homogeneous response mechanisms.

Analysis of the PEI Nutrition Survey requires incorporation of the population weights. Overall analysis will provide representative estimates, however any differences between small subgroups may be the result of pockets of bias. This will restrict analyses such as comparing health regions by each age-sex stratum. Caution is also warranted for generalization of results to the under 20 population, due to the small numbers sampled at the youngest ages.

In conclusion, the effect of non-response bias in this report of the PEI Nutrition Survey is expected to be minimal. The results of the PEI Nutrition Survey should be considered a slightly optimistic representation of the dietary intake of adult Islanders that will provide conservative estimates of nutritional inadequacies.

4 DEMOGRAPHIC CHARACTERISTICS

The demographic characteristics examined in this chapter include location (health region), age, sex, marital status, smoking, self-reported health, education, and income. The information is derived from the Demographic Profile (Appendix A). These characteristics provide a description of the population studied by the PEI Nutrition Survey, using the age-sex strata used for most analyses in this report. Future investigations may need to incorporate these characteristics in a more sophisticated analysis.

4.1 HEALTH REGION

The PEI Nutrition Survey included Islanders from all health regions in PEI, although the sample was not stratified by health region. Table 4.1 includes the sample sizes by health regions. Precision of estimates are affected by these sample sizes. Large variances are expected for the smaller health regions, restricting analysis by strata within health regions. Nutrient intakes by health region are provided in Table G.8 (see Appendix G); additional details on nutrient intake are provided in Chapter 5. Generally, nutrient intake was similar in all regions.

Table 4.1 Sample Size by Health Region

	East Prince	West Prince	Queens	Southern Kings	Eastern Kings
Males	125	236	469	91	74
Females	144	231	444	120	61

4.2 AGE AND SEX

The original sample design for the PEI Nutrition Survey used 12 age-sex strata. The strata were pooled into 8 strata for most analyses for consistency with previous provincial nutrition survey reports, and to provide increased precision of estimates by age-sex strata. Table 4.2 describes the maximum sample size by these 8 age-sex strata. These sample sizes are used for the 24-hour recall data and the food frequency questionnaire, but may be reduced for other questions that did not have 100% response.

4.3 MARITAL STATUS

Table 4.2 describes marital status by the 8 age-sex strata. Marital status is also described with different age-sex strata in Chapter 3.4. Overall, 68% of respondents were married or living common law.

4.4 SMOKING

All respondents to the Demographic Questionnaire were asked a series of smoking questions (see Appendix A), using the same questions as the National Population Health Survey (NPHS) (Stat Can, 1995). Only 0.6% of the PEI Nutrition Survey sample was missing responses to the smoking questions. Table 4.2 describes daily smokers (any number of cigarettes smoked daily) by the 8 age-sex strata; different age-sex strata are used in Chapter 3.4. Overall, 28% of survey participants were daily smokers.

4.5 GENERAL HEALTH

Table 4.2 describes general health status by the 8 age-sex strata. Overall, 58% of respondents believe that their health is very good to excellent, compared to other people their age. Another 11% of respondents believe that their health is fair or poor. This is similar to self-reports of health by Islanders in the 1994/95 NPHS: 62% very good/excellent, and 11% fair/poor (Statistics Canada, 1995).

4.6 EDUCATION

All respondents to the Demographic Questionnaire were asked about their highest level of education attained (see Appendix A), using the same categories as the NPHS. The analysis presented here reduced the categories to three:

- elementary (any schooling that did not involve completion of secondary school)
- secondary (completion of secondary school, and/or some college or university)
- post-secondary (completion of at least one college diploma or university degree)

Only 0.8% of the PEI Nutrition Survey sample was missing responses to the education question. Table 4.2 describes education by the 8 age-sex strata. Education is also described with different age-sex strata in Chapter 3.4. Overall, 30% of respondents had less than a secondary school education. This is similar to the 1994/95 NPHS estimates of 31% of the PEI population with less than a secondary school education (Statistics Canada, 1995).

Nutrient intakes by education levels are provided in Table G.9 (see Appendix G); additional details on nutrient intake are provided in Chapter 5. Generally, nutrient intakes were similar among individuals with differing levels of education. Individuals with lower levels of formal education may have lower calcium intakes compared to those of individuals with a high level of education. These results need to be interpreted with care. Firm conclusions cannot be made regarding the association between education level and dietary intakes without using more sophisticated statistical analysis.

Table 4.2 PEI Nutrition Survey Demographic Characteristics (Population percent, by age and sex)

	Males				Females			
	18-34y	35-49y	50-64y	65-74y	18-34y	35-49y	50-64y	65-74y
(n)	(275)	(261)	(282)	(182)	(258)	(278)	(292)	(167)
Marital Status								
married or common law	38	86	89	72	57	82	81	53
Smoking								
daily smoking rate	35	34	26	23	28	24	20	11
Self-rated Health Status								
excellent/very good	58	52	53	59	55	67	59	58
good	31	36	29	26	37	24	27	28
fair/poor	11	12	18	15	8	9	14	14
Education								
elementary	25	34	53	67	10	17	37	57
secondary	33	27	24	11	29	38	27	17
post secondary	42	39	23	22	60	45	35	26

Table 4.3 Income Adequacy (Population percent, by age and sex)

	Males				Females			
	18-34y	35-49y	50-64y	65-74y	18-34y	35-49y	50-64y	65-74y
(n)	(237)	(236)	(242)	(151)	(226)	(258)	(248)	(131)
Low Income Adequacy	15	13	15	26	23	12	19	34
Middle Income Adequacy	37	40	30	42	39	39	40	40
Upper Income Adequacy	48	47	55	32	38	49	41	26

4.7 INCOME ADEQUACY

All respondents to the Demographic Questionnaire were asked a series questions on household income and household size (see Appendix A), using the same questions as the 1994/95 NPHS. The analysis used the series of questions to define the concept of income adequacy, using higher household income thresholds for larger households (Statistics Canada, 1995). The categories presented here are:

•	low income adequacy	<$15,000	for 1-2 persons
		<$20,000	for 3-4 persons
		<$30,000	for 5+ persons
•	middle income adequacy	$15,000 to <$30,000	for 1-2 persons
		$20,000 to <$40,000	for 3-4 persons
		$30,000 to <$60,000	for 5+ persons
•	upper income adequacy	$30,000 +	for 1-2 persons
		$40,000 +	for 3-4 persons
		$60,000 +	for 5+ persons

Overall, 13% of the survey sample was missing responses to the income questions.

Table 4.3 describes income adequacy levels by the 8 age-sex strata. Overall, income adequacy of survey participants were categorized as 18% low, 38% middle, and 44% upper level of income adequacy. This closely reflects the 1994/95 NPHS PEI population estimates of 19% low, 40% middle, and 41% upper level of income adequacy (Statistics Canada, 1995), as well as the stratum-specific estimates.

Nutrient intakes by income adequacy are provided in Table G.10 (see Appendix G); additional details on nutrient intake are provided in Chapter 5. Generally, nutrient intakes were similar across income levels. Comparisons across income levels may be influenced by the group with unknown income adequacy. However, nutrient intakes for this category were generally between the extremes in other income adequacy categories. Firm conclusions cannot be made regarding the association between income and dietary intakes without using more sophisticated statistical analysis. Multivariate analyses should take into account the potentially confounding effects of age, sex, smoking, and possibly household food insecurity. Additional analyses may require other definitions of income categories and income adequacy.

5 ENERGY AND NUTRIENT INTAKES

The purpose of this chapter is to present a profile of energy and nutrient intakes of male and female Islanders and to identify dietary inadequacies in population subgroups. These results are compared with other provincial nutrition surveys conducted in the past decade, and, where possible, the Nutrition Canada survey conducted in the early 1970's (Health and Welfare Canada, 1975).

The confidence intervals that are not included in the tables of this report are found in Appendix G. Comparisons made among age and sex groups are primarily observational and do not reflect the results of statistical testing. More detailed analysis which considers the distribution and variance of nutrient intakes would be required in order to confirm observed differences noted in this chapter.

Values for Vitamin E and D are not included in the tables because, at the time the data were processed, the *Canadian Nutrient File* (1991 version) did not contain vitamin E values for all foods, and vitamin D values were available for fortified foods only. As a result, the intakes of these vitamins would be underestimated. Nutrient intakes described in this report were derived from food sources only. Respondents were asked about supplement use, but these will be presented in a separate report.

5.1 MEASURING NUTRIENT INTAKES

Dietary information was collected for one day using the 24-hour recall (see Chapter 2.2.1), and do not take into account consumption of nutritional supplements. Mean nutrient intakes from food sources and confidence intervals are presented in Tables 5.1 and 5.2.

Since day to day variation in food intake within individuals can be considerable, a single day recall cannot be used to provide valid estimates of usual intake, distributions of intakes, or to estimate the proportion of the population above or below a cut point (Beaton et al, 1979; Beaton et al, 1983). The PEI Nutrition Survey used a repeat 24-hour recall collected on one third of the sample; nutrient intakes were then adjusted for intra-subject variability (see Chapter 2.6.3 or Junkins et al, 2001a). The adjustment narrows the distribution of intakes, producing a better estimate of the proportion of the group with intakes above the recommended level (Beaton et al, 1979; Beaton et al, 1983). Adjusted nutrient intakes from food sources are presented in Tables 5.3 and 5.4. , as well as tables showing distribution of individuals (Tables 5.9, 5.10, 5.11, 5.12, 5.13, 5.15). As indicated in Tables 5.3 and 5.4, nutrient intake distributions are skewed in nature.

5.1.1 Differences by Sex

Whether we consider mean intakes (Tables 5.1 and 5.2) or median intakes (50th percentile in Tables 5.3 and 5.4), energy and nutrient intakes among men were considerably higher than those among women for all age categories. Total energy and nutrient intakes by sex are shown in Table G.1 (see Appendix G).

However, when nutrient intakes are related to energy (Tables 5.5, 5.6), there appear to be some differences between men and women. Women appeared to consume diets with higher concentrations of carbohydrate, fibre, calcium, vitamin A, vitamin C and folate compared to men. Males consumed diets which were apparently higher in total fat, saturated fat, cholesterol and vitamin B_{12} compared to women. All other nutrient density values were similar between groups.

5.1.2 Differences by Age

The intake of energy and all macronutrients decreased with age in both males and females when comparing both mean intakes (Tables 5.1 and 5.2) or median intakes (50th percentile in Tables 5.3 and 5.4). There was also an apparent decrease in monounsaturated and saturated fat with age. In contrast, intake of polyunsaturates remained stable across age groups.

Because of the variations in energy consumption with age, the concentration of nutrients in the diet is a useful parameter for estimating changes in the nutrient density of foods consumed. In both men and women (Table 5.5, 5.6), dietary concentration of many nutrients appear to increase with age, including carbohydrate, fibre, vitamin A, folate, pantothenic acid, thiamin, magnesium, and potassium. Men's dietary concentration of calcium and alcohol apparently decreased with age. Among women (Table 5.6), the dietary concentration of saturated fat and alcohol decreased with age.

List of Tables in Section 5.1

MEASURING NUTRIENT INTAKES

Table 5.1 **Nutrient Intakes** of PEI Males (Mean and 95% Confidence Interval by Age)

Table 5.2 Nutrient Intakes of PEI Females (Mean and 95% Confidence Interval by Age)

Table G.1 Nutrient Intake, by Sex: Means and 95% Confidence Intervals

Table 5.3 **Percentiles of Nutrient Intake** of PEI Males by Age
Table G.2 Nutrient Intake, Males: Medians and 95% Confidence Intervals

Table 5.4 Percentiles of Nutrient Intake of PEI Females by Age
Table G.3 Nutrient Intake, Females: Medians and 95% Confidence Intervals

Table 5.5 **Nutrient Density** of PEI Males (Mean Intake per 1,000 kcal by Age)
Table G.4 Nutrient Density, Males: Means and 95% Confidence Intervals

Table 5.6 Nutrient Density of PEI Females (Mean Intake per 1,000 kcal by Age)
Table G.5 Nutrient Density, Females: Means and 95% Confidence Intervals

Table 5.1 Nutrient Intakes[1] of PEI Males (Mean and 95% Confidence Interval by Age)

	18-34 yr		35-49 yr		50-64 yr		65-74 yr	
(n)	(275)		(261)		(282)		(182)	
	Mean	[95% CI]	Mean	[95% CI]	Mean	[95%CI]	Mean	[95% CI]
Energy (kcal)	2859	[2721,2997]	2522	[2404, 2640]	2311	[2207, 2414]	2175	[2054,2296]
Protein (g)	118	[111, 125]	100	[94.1, 106]	97.1	[92.4, 102]	86.5	[81.3, 91.6]
Carbohydrate (g)	338	[320, 356]	297	[281, 312]	274	[261, 287]	275	[260, 291]
Total Fat (g)	109	[103, 115]	100	[93.8, 105]	89.7	[84.4, 95.1]	81.8	[75.2, 88.4]
Saturated fatty acids (g)	40.1	[37.7, 42.5]	36.0	[33.6, 38.4]	32.5	[30.3, 34.7]	29.0	[26.3, 31.4]
Polyunsaturated fatty acids (g)	15.8	[14.7, 16.9]	15.3	[14.2, 16.3]	14.0	[12.9, 15.2]	13.0	[11.8, 14.2]
Monounsaturated fatty acids (g)	44.1	[41.4, 46.7]	40.8	[38.2, 43.5]	36.1	[33.8, 38.4]	32.7	[29.7, 35.7]
Cholesterol (mg)	381	[351, 412]	371	[341, 401]	351	[321, 381]	341	[307, 375]
Dietary Fibre (g)	16.4	[15.3, 17.5]	16.1	[15.0, 17.1]	16.7	[15.6, 17.8]	18.3	[16.8, 19.8]
Sodium (mg)	3854	[3618, 4090]	3366	[3160, 3572]	3161	[2971, 3351]	2884	[2681, 3086]
Potassium (mg)	3811	[3590, 4031]	3359	[3192, 3527]	3273	[3127, 3420]	3239	[3068, 3409]
Calcium (mg)	1151	[1064, 1238]	838	[781, 895]	791	[737, 844]	785	[722, 848]
Phosphorous (mg)	1789	[1685, 1894]	1470	[1396, 1545]	1416	[1352, 1479]	1365	[1289, 1140]
Magnesium (mg)	353	[335, 372]	318	[302, 335]	306	[292, 320]	307	[289, 325]
Iron (mg)	17.6	[16.5, 18.6]	16.3	[15.1, 17.4]	15.7	[14.8, 16.5]	15.4	[14.3, 16.4]
Zinc (mg)	15.3	[14.3, 16.3]	14.1	[12.3, 15.9]	12.6	[11.8, 13.3]	11.2	[10.3, 12.0]
Vitamin A (RE)	1164	[1038, 1289]	1186	[1023, 1348]	1615	[1205, 2025]	1746	[1344, 2148]
Thiamin (mg)	1.92	[1.79, 2.05]	1.74	[1.62, 1.85]	1.74	[1.63, 1.84]	1.72	[1.60, 1.84]
Riboflavin (mg)	2.47	[2.32, 2.62]	2.01	[1.90, 2.11]	1.95	[1.81, 2.10]	1.94	[1.78, 2.10]
Niacin (eq)	50.3	[47.3, 53.3]	43.7	[41.3, 46.2]	42.4	[40.3, 44.5]	37.2	[35.0, 39.3]
Vitamin B_6 (mg)	2.20	[2.05, 2.34]	1.97	[1.85, 2.09]	1.95	[1.84, 2.06]	1.94	[1.81, 2.06]
Vitamin B_{12} (µg)	9.78	[6.89, 12.7]	9.26	[6.14, 12.4]	8.79	[5.82, 11.8]	9.02	[6.15, 11.9]
Pantothenic acid (mg)	6.28	[5.89, 6.67]	5.35	[5.06, 5.65]	5.51	[5.08, 5.93]	5.76	[5.32, 6.21]
Folate (µg)	244	[226, 262]	224	[210, 238]	231	[216, 246]	237	[221, 253]
Vitamin C (mg)	113	[98.5, 128]	91.3	[78.9, 104]	88.3	[79.5, 97.0]	96.4	[85.2, 108]
Caffeine (mg)	196	[150, 242]	316	[276, 355]	251	[223, 279]	172	[151, 192]
Alcohol (g)	9.18	[6.00, 12.4]	7.36	[5.08, 9.64]	4.49	[2.71, 6.27]	2.61	[1.16, 4.06]

[1] Intakes based on single day recalls from food sources only

Table 5.2 Nutrient Intakes[1] of PEI Females (Mean and 95% Confidence Interval by Age)

	18-34 yr		35-49 yr		50-64 yr		65-74 yr	
(n)	(258)		(278)		(292)		(167)	
	Mean	[95% CI]	Mean	[95% CI]	Mean	[95%CI]	Mean	[95% CI]
Energy (kcal)	1789	[1703, 1875]	1630	[1553, 1706]	1610	[1538, 1682]	1480	[1407, 1552]
Protein (g)	71.1	[66.9, 75.3]	64.7	[61.6, 67.8]	65.0	[61.9, 68.0]	57.8	[54.7, 60.9]
Carbohydrate (g)	227	[215, 238]	203	[193, 214]	210	[200, 220]	200	[188, 212]
Total fat (g)	67.0	[62.9, 71.1]	62.2	[58.2, 66.1]	57.1	[53.6, 60.7]	51.6	[48.2, 55.0]
Saturated fatty acids (g)	24.5	[22.9, 26.2]	22.1	[20.4, 23.8]	20.2	[18.6, 21.7]	18.1	[16.6, 19.6]
Polyunsaturated fatty acids (g)	10.3	[9.49, 11.1]	10.0	[9.26, 10.7]	10.0	[8.96, 10.4]	9.0	[8.10, 9.79]
Monounsaturated fatty acids (g)	26.6	[24.9, 28.4]	24.9	[23.3, 26.6]	22.8	[21.3, 24.3]	20.3	[18.8, 21.7]
Cholesterol (mg)	218	[199, 237]	213	[193, 233]	210	[194, 226]	197	[178, 216]
Dietary Fibre (g)	11.5	[10.7, 12.2]	12.5	[11.7, 13.4]	13.9	[13.1, 14.8]	13.9	[12.8, 15.0]
Sodium (mg)	2530	[2376, 2683]	2334	[2184, 2484]	2325	[2191, 2459]	1977	[1846, 2108]
Potassium (mg)	2422	[2275, 2568]	2386	[2276, 2495]	2489	[2372, 2606]	2351	[2221, 2480]
Calcium (mg)	714	[658, 769]	637	[594, 680]	600	[559, 642]	547	[504, 591]
Phosphorous (mg)	1085	[1025, 1145]	1020	[968, 1071]	1023	[974, 1073]	952	[897, 1007]
Magnesium (mg)	228	[215, 241]	229	[217, 241]	240	[228, 251]	222	[209, 235]
Iron (mg)	10.6	[10.0, 11.2]	10.9	[10.4, 11.5]	11.6	[11.0, 12.1]	11.4	[10.6, 12.3]
Zinc (mg)	8.97	[8.35, 9.60]	8.49	[8.01, 8.96]	8.61	[8.08, 9.16]	7.81	[7.16, 8.46]
Vitamin A (RE)	962	[808, 1117]	808	[718, 899]	1159	[1007, 1311]	1393	[1109, 1676]
Thiamin (mg)	1.20	[1.12, 1.28]	1.18	[1.10, 1.26]	1.26	[1.19, 1.33]	1.19	[1.11, 1.27]
Riboflavin (mg)	1.43	[1.34, 1.51]	1.35	[1.28, 1.42]	1.37	[1.30, 1.43]	1.32	[1.23, 1.41]
Niacin (eq)	31.3	[29.3, 33.2]	28.2	[26.8, 29.5]	28.6	[27.3, 29.9]	25.6	[24.1, 27.1]
Vitamin B_6 (mg)	1.41	[1.31, 1.51]	1.33	[1.25, 1.40]	1.41	[1.33, 1.48]	1.30	[1.21, 1.39]
Vitamin B_{12} (μg)	3.90	[3.11, 4.70]	4.30	[3.22, 5.38]	4.17	[3.44, 4.90]	7.48	[4.70, 10.3]
Pantothenic acid (mg)	3.84	[3.61, 4.07]	3.61	[3.42, 3.79]	3.84	[3.65, 4.03]	3.88	[3.59, 4.17]
Folate (μg)	155	[145, 166]	176	[165, 186]	182	[171, 192]	181	[169, 194]
Vitamin C (mg)	80.9	[70.8, 90.9]	71.5	[63.7, 79.3]	78.7	[71.1, 86.4]	79.8	[70.7, 89.0]
Caffeine (mg)	177	[123, 232]	260	[220, 299]	204	[185, 223]	151	[133, 169]
Alcohol (g)	1.57	[0.587, 2.56]	2.17	[1.30, 3.04]	1.89	[1.00, 2.78]	0.68	[-0.214, 1.58]

[1] Intakes based on single day recalls from food sources only

M121

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Table 5.3 Percentiles of Nutrient Intake[1] of PEI Males by Age

	18-34yr			35-49yr			50-64yr			65-74yr		
(n)	(275)			(261)			(282)			(182)		
	25th	50th [2]	75th	25th	50th [2]	75th	25th	50th [2]	75th	25th	50th [2]	75th
Energy (kcal)	2330	2683	3079	2080	2397	2781	1852	2240	2564	1697	2092	2423
Protein (g)	87	105	130	79	92	108	80	90	103	70	81	96
Carbohydrate (g)	255	318	376	233	273	327	223	261	307	213	261	309
Total Fat (g)	90	102	113	75	94	111	68	84	102	59	75	96
Saturated Fatty acids (g)	31	36	43	26	31	40	22	29	37	18	26	33
Polyunsaturated fatty acids (g)	11	14	17	11	13	16	10	12	15	9	11	14
Monounsaturated fatty acids (g)	35	41	47	30	37	45	26	34	41	22	29	38
Cholesterol (mg)	254	307	379	244	301	383	228	286	364	212	269	368
Dietary Fibre (g)	12	15	18	11	15	18	11	15	20	12	16	22
Sodium (mg)	3064	3415	3880	2613	3062	3630	2314	2850	3493	2220	2650	3103
Potassium (mg)	2852	3530	4176	2708	3205	3786	2658	3184	3761	2613	3119	3786
Calcium (mg)	738	969	1254	587	771	988	517	706	919	528	691	901
Phosphorous (mg)	1304	1599	1960	1188	1415	1645	1147	1345	1585	1092	1285	1539
Magnesium (mg)	265	333	395	247	295	359	246	290	353	238	296	344
Iron (mg)	14	16	18	12	14	17	12	14	17	11	14	16
Zinc (mg)	10	13	17	10	12	13	10	11	13	8	10	12
Vitamin A (RE)	698	824	1006	659	823	1064	657	859	1304	718	1001	1525
Thiamin (mg)	1.4	1.7	1.9	1.3	1.6	1.9	1.2	1.6	1.9	1.3	1.5	1.9
Riboflavin (mg)	1.8	2.2	2.6	1.6	1.9	2.2	1.5	1.8	2.1	1.5	1.7	2.1
Niacin (eq)	37	45	55	35	41	47	35	39	45	30	35	42
Vitamin B_6 (mg)	1.5	2.0	2.5	1.5	1.8	2.2	1.4	1.9	2.2	1.5	1.8	2.2
Vitamin B_{12}(µg)	3.8	5.6	7.9	3.2	4.3	5.6	3.2	4.3	5.5	3.0	3.9	5.5
Pantothenic acid (mg)	4.6	5.6	7.2	4.2	5.0	6.1	4.3	5.1	6.0	4.3	5.3	6.1
Folate (µg)	169	216	265	167	197	247	162	206	254	175	221	259
Vitamin C (mg)	45	75	122	45	66	93	44	68	101	45	78	117

[1] Intakes from food sources only, adjusted for intra-subject variability

[2] 95% confidence intervals for median intakes found in Appendix G

Source: BBCA E451311-007BV2

Table 5.4 Percentiles of Nutrient Intake[1] of PEI Females by Age

	18-34yr			35-49yr			50-64yr			65-74yr		
(n)	(258)			(278)			(292)			(167)		
	25th	50th [2]	75th	25th	50th [2]	75th	25th	50th [2]	75th	25th	50th [2]	75th
Energy (kcal)	1388	1710	2040	1311	1554	1830	1257	1514	1800	1224	1449	1656
Protein (g)	52	65	79	53	62	71	53	61	69	48	56	65
Carbohydrate (g)	175	216	252	161	197	233	163	200	233	159	189	226
Total Fat (g)	49	61	78	43	59	74	40	54	65	42	48	58
Saturated fatty acids (g)	17	22	28	15	19	25	13	18	23	13	16	20
Polyunsaturated fatty acids (g)	7.3	8.8	10.0	6.8	8.7	11.0	6.5	8.4	11.0	5.9	7.7	10.0
Monounsaturated fatty acids (g)	19	24	31	18	23	29	16	21	27	16	19	23
Cholesterol (mg)	138	178	224	131	166	211	137	170	215	132	159	197
Dietary Fibre (g)	8.4	10.0	13.0	8.2	11.0	15.0	8.9	13.0	17.0	9.2	13.0	16.0
Sodium (mg)	1921	2297	2743	1775	2086	2577	1697	2104	2601	1612	1880	2206
Potassium (mg)	1827	2219	2700	1871	2305	2736	1890	2372	2894	1874	2228	2761
Calcium (mg)	423	621	851	421	581	766	388	530	712	388	496	634
Phosphorous (mg)	779	993	1272	783	964	1150	795	963	1165	748	914	1039
Magnesium (mg)	170	209	253	177	214	259	182	228	268	174	209	249
Iron (mg)	8.2	10.0	12.0	8.5	10.0	12.0	8.9	11.0	13.0	8.7	11.0	12.0
Zinc (mg)	6.5	7.9	9.5	6.8	7.9	8.7	6.8	7.7	8.6	6.1	7.0	8.2
Vitamin A (RE)	360	540	871	427	570	793	536	691	990	635	822	1096
Thiamin (mg)	0.8	1.0	1.3	0.8	1.1	1.3	0.9	1.2	1.4	0.9	1.1	1.3
Riboflavin (mg)	1.0	1.3	1.6	1.0	1.3	1.5	1.1	1.3	1.5	1.0	1.2	1.4
Niacin (eq)	23	29	34	23	27	31	23	27	31	21	25	29
Vitamin B_6 (mg)	1.0	1.2	1.6	1.1	1.3	1.5	1.1	1.3	1.5	1.0	1.2	1.5
Vitamin B_{12}(µg)	2.3	2.8	3.3	2.2	2.7	3.3	2.2	2.7	3.3	2.3	2.7	3.3
Pantothenic acid (mg)	2.7	3.6	4.3	2.8	3.4	4.3	2.9	3.6	4.4	3.0	3.5	4.3
Folate (µg)	109	133	179	116	157	198	129	166	210	130	168	202
Vitamin C (mg)	33	48	90	35	51	85	37	63	91	39	67	98

Source: BBCA E451311-007BV2

[1] Intakes from food sources only, adjusted for intra-subject variability

[2] 95% confidence intervals for median intakes found in Appendix G

Table 5.3 Percentiles of Nutrient Intake[1] of PEI Males by Age

	18-34yr			35-49yr			50-64yr			65-74yr		
(n)	(275)			(261)			(2Ɛ2)			(182)		
	25th	50th [2]	75th	25th	50th [2]	75th	25th	50th [2]	75th	25th	50th [2]	75th
Energy (kcal)	2330	2683	3079	2080	2397	2781	1852	2240	2564	1697	2092	2423
Protein (g)	87	105	130	79	92	108	80	90	103	70	81	96
Carbohydrate (g)	255	318	376	233	273	327	223	261	307	213	261	309
Total Fat (g)	90	102	113	75	94	111	68	84	102	59	75	96
Saturated Fatty acids (g)	31	36	43	26	31	40	22	29	37	18	26	33
Polyunsaturated fatty acids (g)	11	14	17	11	13	16	10	12	15	9	11	14
Monounsaturated fatty acids (g)	35	41	47	30	37	45	26	34	41	22	29	38
Cholesterol (mg)	254	307	379	244	301	383	228	286	364	212	269	368
Dietary Fibre (g)	12	15	18	11	15	18	11	15	20	12	16	22
Sodium (mg)	3064	3415	3880	2613	3062	3630	2314	2850	3493	2220	2650	3103
Potassium (mg)	2852	3530	4176	2708	3205	3786	2658	3184	3761	2613	3119	3786
Calcium (mg)	738	969	1254	587	771	988	517	706	919	528	691	901
Phosphorous (mg)	1304	1599	1960	1188	1415	1645	1147	1345	1585	1092	1285	1539
Magnesium (mg)	265	333	395	247	295	359	246	290	353	238	296	344
Iron (mg)	14	16	18	12	14	17	12	14	17	11	14	16
Zinc (mg)	10	13	17	10	12	13	10	11	13	8	10	12
Vitamin A (RE)	698	824	1006	659	823	1064	657	859	1304	718	1001	1525
Thiamin (mg)	1.4	1.7	1.9	1.3	1.6	1.9	1.2	1.6	1.9	1.3	1.5	1.9
Riboflavin (mg)	1.8	2.2	2.6	1.6	1.9	2.2	1.5	1.8	2.1	1.5	1.7	2.1
Niacin (eq)	37	45	55	35	41	47	35	39	45	30	35	42
Vitamin B_6 (mg)	1.5	2.0	2.5	1.5	1.8	2.2	1.4	1.9	2.2	1.5	1.8	2.2
Vitamin B_{12}(µg)	3.8	5.6	7.9	3.2	4.3	5.6	3.2	4.3	5.5	3.0	3.9	5.5
Pantothenic acid (mg)	4.6	5.6	7.2	4.2	5.0	6.1	4.3	5.1	6.0	4.3	5.3	6.1
Folate (µg)	169	216	265	167	197	247	162	206	254	175	221	259
Vitamin C (mg)	45	75	122	45	66	93	44	68	101	45	78	117

[1] Intakes from food sources only, adjusted for intra-subject variability
[2] 95% confidence intervals for median intakes found in Appendix G

Source: BBCA E451311-007BV2

Table 5.4 Percentiles of Nutrient Intake[1] of PEI Females by Age

	18-34yr			35-49yr			50-64yr			65-74yr		
(n)	(258)			(278)			(292)			(167)		
	25th	50th [2]	75th	25th	50th [2]	75th	25th	50th [2]	75th	25th	50th [2]	75th
Energy (kcal)	1388	1710	2040	1311	1554	1830	1257	1514	1800	1224	1449	1656
Protein (g)	52	65	79	53	62	71	53	61	69	48	56	65
Carbohydrate (g)	175	216	252	161	197	233	163	200	233	159	189	226
Total Fat (g)	49	61	78	43	59	74	40	54	65	42	48	58
Saturated fatty acids (g)	17	22	28	15	19	25	13	18	23	13	16	20
Polyunsaturated fatty acids (g)	7.3	8.8	10.0	6.8	8.7	11.0	6.5	8.4	11.0	5.9	7.7	10.0
Monounsaturated fatty acids (g)	19	24	31	18	23	29	16	21	27	16	19	23
Cholesterol (mg)	138	178	224	131	166	211	137	170	215	132	159	197
Dietary Fibre (g)	8.4	10.0	13.0	8.2	11.0	15.0	8.9	13.0	17.0	9.2	13.0	16.0
Sodium (mg)	1921	2297	2743	1775	2086	2577	1697	2104	2601	1612	1880	2206
Potassium (mg)	1827	2219	2700	1871	2305	2736	1890	2372	2894	1874	2228	2761
Calcium (mg)	423	621	851	421	581	766	388	530	712	388	496	634
Phosphorous (mg)	779	993	1272	783	964	1150	795	963	1165	748	914	1039
Magnesium (mg)	170	209	253	177	214	259	182	228	268	174	209	249
Iron (mg)	8.2	10.0	12.0	8.5	10.0	12.0	8.9	11.0	13.0	8.7	11.0	12.0
Zinc (mg)	6.5	7.9	9.5	6.8	7.9	8.7	6.8	7.7	8.6	6.1	7.0	8.2
Vitamin A (RE)	360	540	871	427	570	793	536	691	990	635	822	1096
Thiamin (mg)	0.8	1.0	1.3	0.8	1.1	1.3	0.9	1.2	1.4	0.9	1.1	1.3
Riboflavin (mg)	1.0	1.3	1.6	1.0	1.3	1.5	1.1	1.3	1.5	1.0	1.2	1.4
Niacin (eq)	23	29	34	23	27	31	23	27	31	21	25	29
Vitamin B_6 (mg)	1.0	1.2	1.6	1.1	1.3	1.5	1.1	1.3	1.5	1.0	1.2	1.5
Vitamin B_{12}(µg)	2.3	2.8	3.3	2.2	2.7	3.3	2.2	2.7	3.3	2.3	2.7	3.3
Pantothenic acid (mg)	2.7	3.6	4.3	2.8	3.4	4.3	2.9	3.6	4.4	3.0	3.5	4.3
Folate (µg)	109	133	179	116	157	198	129	166	210	130	168	202
Vitamin C (mg)	33	48	90	35	51	85	37	63	91	39	67	98

Source: BBCA E451311-007BV2

[1] Intakes from food sources only, adjusted for intra-subject variability

[2] 95% confidence intervals for median intakes found in Appendix G

Table 5.5 Nutrient Density of PEI Males (Mean Intake per 1,000 kcal[1,2] by Age)

	18-34yr	35-49yr	50-64yr	65-74yr
(n)	(275)	(261)	(282)	(182)
Protein (g/1000 kcal)	41.8	40.2	43.1	40.9
Carbohydrate (g/1000 kcal)	119	118	120	129
Total fat (g/1000 kcal)	37.9	39.2	38.0	36.4
Saturated fatty acids (g/1000 kcal)	14.0	14.1	13.7	12.8
Polyunsaturated fatty acids (g/1000 kcal)	5.58	6.10	5.95	5.90
Monounsaturated fatty acids (g/1000 kcal)	15.3	16.0	15.3	14.5
Cholesterol (mg/1000 kcal)	134	151	154	161
Dietary Fibre (g/1000 kcal)	5.95	6.61	7.47	8.89
Sodium (mg/1000 kcal)	1393	1365	1398	1353
Potassium (mg/1000 kcal)	1367	1382	1474	1558
Calcium (mg/1000 kcal)	411	341	348	367
Phosphorous (mg/1000 kcal)	635	595	630	651
Magnesium (mg/1000 kcal)	126	130	138	148
Iron (mg/1000 kcal)	6.50	6.52	6.92	7.39
Zinc (mg/1000 kcal)	5.38	5.57	5.62	5.29
Vitamin A (RE/1000 kcal)	424	523	687	895
Thiamin (mg/1000 kcal)	0.68	0.71	0.77	0.81
Riboflavin (mg/1000 kcal)	0.87	0.84	0.86	0.91
Niacin (eq/1000 kcal)	17.8	17.7	18.9	17.7
Vitamin B_6 (mg/1000 kcal)	0.78	0.80	0.88	0.94
Vitamin B_{12} (µg/1000 kcal)	4.35	3.77	3.80	4.89
Pantothenic acid (mg/1000 kcal)	2.23	2.19	2.44	2.80
Folate (µg/1000 kcal)	86.3	91.5	104	116
Vitamin C (mg/1000 kcal)	39.8	37.7	40.6	47.2
Caffeine (mg/1000 kcal)	68.9	125	109	79.1
Alcohol (g/1000 kcal)	3.2	2.9	1.9	1.2

[1] Intakes based on single day recalls from food sources only

[2] 95% confidence intervals found in Appendix G.

Table 5.6 **Nutrient Density of PEI Females (Mean Intake per 1,000 kcal[1,2] by Age)**

	18-34yr	35-49yr	50-64yr	65-74yr
(n)	(258)	(278)	(292)	(167)
Protein (g/1000 kcal)	40.2	41.0	41.6	40.3
Carbohydrate (g/1000 kcal)	128	126	132	135
Total fat (g/1000 kcal)	34.6	37.1	31.9	34.4
Saturated fatty acids (g/1000 kcal)	13.4	13.1	12.0	12.0
Polyunsaturated fatty acids (g/1000 kcal)	5.70	6.02	5.95	6.03
Monounsaturated fatty acids (g/1000 kcal)	14.7	14.9	13.8	13.5
Cholesterol (mg/1000 kcal)	120	133	133	137
Dietary Fibre (g/1000 kcal)	6.61	8.04	8.97	9.64
Sodium (mg/1000 kcal)	1443	1456	1505	1362
Potassium (mg/1000 kcal)	1387	1555	1614	1646
Calcium (mg/1000 kcal)	401	403	384	383
Phosphorous (mg/1000 kcal)	614	643	658	665
Magnesium (mg/1000 kcal)	130	148	155	155
Iron (mg/1000 kcal)	6.05	7.00	7.42	7.83
Zinc (mg/1000 kcal)	5.11	5.40	5.50	5.42
Vitamin A (RE/1000 kcal)	574	535	729	994
Thiamin (mg/1000 kcal)	0.69	0.75	0.81	0.83
Riboflavin (mg/1000 kcal)	0.80	0.87	0.88	0.91
Niacin (eq/1000 kcal)	17.8	18.0	18.5	17.8
Vitamin B_6 (mg/1000 kcal)	0.80	0.86	0.91	0.92
Vitamin B_{12} (µg/1000 kcal)	2.19	2.83	2.68	5.03
Pantothenic acid (mg/1000 kcal)	2.19	2.30	2.48	2.70
Folate (µg/1000 kcal)	88.5	114	118	127
Vitamin C (mg/1000 kcal)	45.1	48.4	51.5	55.3
Caffeine (mg/1000 kcal)	98.9	145	114	83.8
Alcohol (g/1000 kcal)	0.9	1.2	1.1	0.4

[1] Intakes based on single day recalls from food sources only

[2] 95% confidence intervals found in Appendix G.

5.2 SOURCES OF ENERGY INTAKE

Table 5.7 shows the mean percentages of energy intake from protein, carbohydrate, fat, and alcohol, as well as from saturated, polyunsaturated, and mono-unsaturated fatty acids. Macronutrient intakes in g/d were converted to energy provided using the appropriate Atwater factors (4 calories/g carbohydrate, 9 calories/g fat, 4 calories/g protein, and 7 calories/g alcohol) and divided by the total energy intake.

The proportion of energy from protein was fairly constant across all age and sex groups, while the proportion of energy from carbohydrates appeared to increase with age in both males and females. There is a general tendency for the percentage of energy from fat and saturated fat to decrease with age, particularly among females. Consistent with mean intakes of alcohol, there was a low percentage of energy intake from alcohol, particularly in women. These figures must be interpreted carefully because of the large inter-individual variability of alcohol consumption and the problem of under-reporting alcohol (da Costa Pereira et al, 1993).

Table 5.7 Nutrient Sources Contributing to Energy Intake[1] (Mean % of calories by Age and Sex)

		Males				Females			
Nutrient		**18 to 34 yr**	**35 to 49 yr**	**50 to 64 yr**	**65 to 74 yr**	**18 to 34 yr**	**35 to 49 yr**	**50 to 64 yr**	**65 to 74 yr**
(% of calories)	(n)	(275)	(261)	(282)	(182)	(258)	(278)	(292)	(167)
Protein		16.5	15.8	16.7	15.7	15.8	15.7	16.0	15.4
Carbohydrate		47.2	46.8	47.2	50.0	50.2	49.4	51.6	53.3
Total Fat		34.1	35.4	34.8	33.4	33.4	34.0	31.6	31.0
Saturated Fatty Acids		12.1	12.6	12.3	11.4	11.9	11.7	10.7	10.7
Polyunsaturated Fatty Acids		5.0	5.5	5.3	5.3	5.1	5.4	5.3	5.4
Monounsaturated Fatty Acids		13.7	14.4	13.7	12.9	13.1	13.3	12.3	12.0
Alcohol		2.2	2.0	1.4	0.8	0.6	0.9	0.8	0.3

[1] Intakes based on single day recalls from food sources only

Source: BBCA E451311-007BV2

M121

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5.3 COMPARISON WITH RECOMMENDED INTAKES

5.3.1 Macronutrient Recommendations

Table 5.8 includes a comparison of the macronutrients with the Recommended Nutrient Intakes for Canadians (RNI's) (Health and Welfare Canada, 1990), which includes recommendations for the levels of protein, carbohydrate and fat in the diet.

For all age groups, protein intake as a % of energy exceeded the recommendations. When protein was expressed per kg body weight , the mean for all groups approached or exceeded the recommended level of 0.86 g/kg except for women 65-74 whose mean intake was slightly lower, at 0.85 g/kg. An examination of the distribution of protein intakes (Table 5.9) indicated that 3% or less of Islanders had protein intakes of less than 10% of energy. The majority of adult Islanders had intakes which had 15% or more of energy from protein, with a higher proportion among males.

Table 5.8 Comparison of Mean Intakes[1] of Macronutrients with Recommendations[2]

		Males				Females			
	RNI[2]	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr
Protein (g/kg body wt)	0.86	1.49	1.18	1.15	1.08	1.07	0.98	0.92	0.85
Protein (% of calories)	13 - 15 % (15 - 20 % if 65-74 yr)	16.5	15.8	16.7	15.7	15.8	15.7	16.0	15.4
Carbohydrate (% of calories)	55 %	48.0	47.1	47.5	50.3	50.5	49.7	51.9	53.6
Fat (% of calories)	30 %	34.1	35.4	34.8	33.4	33.4	34.0	31.6	31.0
Saturated Fat (% of calories)	10 %	12.1	12.6	12.3	11.4	11.9	11.7	10.7	10.7

[1] Intakes based on single day recalls from food sources only

[2] Recommended Nutrient Intake, Health and Welfare Canada, 1990

Although the mean intake of carbohydrate as a per cent of energy in women exceeded male intakes, no age group met the guideline of 55% of energy from carbohydrate (Table 5.8). The distribution of carbohydrate intakes is shown in Table 5.9. The proportion of men and women meeting the recommendation of 55% of energy appeared to increase with age, with younger age groups being least likely to consume carbohydrate in their diet at this level.

5.3 COMPARISON WITH RECOMMENDED INTAKES

5.3.1 Macronutrient Recommendations

Table 5.8 includes a comparison of the macronutrients with the Recommended Nutrient Intakes for Canadians (RNI's) (Health and Welfare Canada, 1990), which includes recommendations for the levels of protein, carbohydrate and fat in the diet.

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Table 5.8 Comparison of Mean Intakes[1] of Macronutrients with Recommendations[2]

		Males				Females			
	RNI[2]	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr
Protein (g/kg body wt)	0.86	1.49	1.18	1.15	1.08	1.07	0.98	0.92	0.85
Protein (% of calories)	13 - 15 % (15 - 20 % if 65-74 yr)	16.5	15.8	16.7	15.7	15.8	15.7	16.0	15.4
Carbohydrate (% of calories)	55 %	48.0	47.1	47.5	50.3	50.5	49.7	51.9	53.6
Fat (% of calories)	30 %	34.1	35.4	34.8	33.4	33.4	34.0	31.6	31.0
Saturated Fat (% of calories)	10 %	12.1	12.6	12.3	11.4	11.9	11.7	10.7	10.7

[1] Intakes based on single day recalls from food sources only
[2] Recommended Nutrient Intake, Health and Welfare Canada, 1990

Although the mean intake of carbohydrate as a per cent of energy in women exceeded male intakes, no age group met the guideline of 55% of energy from carbohydrate (Table 5.8). The distribution of carbohydrate intakes is shown in Table 5.9. The proportion of men and women meeting the recommendation of 55% of energy appeared to increase with age, with younger age groups being least likely to consume carbohydrate in their diet at this level.

Mean fat intake exceeded the recommended 30% of energy in all age groups for men and women (Table 5.8). A more detailed analysis of the proportion of individuals at various levels of fat intake is found in Table 5.9. Generally, fewer men than women had a fat intake of 30% of energy or less. More men than women had diets containing over 40% energy from fat. As with total fat, a higher proportion of women than men consumed the recommended less than 10% of calories from saturated fat (Table 5.9).

Table 5.9 Distribution of Macronutrient Intakes[1] (% of Individuals by Age and Sex)

	Males				Females			
	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr
(n)	(275)	(261)	(285)	(182)	(258)	(278)	(292)	(167)
Protein								
≤10% of calories	2	<1	<1	3	3	<1	<1	1
>10 to ≤15% of calories	37	37	25	39	42	35	31	43
>15 of calories	61	63	75	58	56	65	68	55
Carbohydrates								
≤ 45% of calories	35	41	30	21	7	13	9	8
>45 to ≤50% of calories	37	25	34	25	37	36	29	18
>50 to ≤55% of calories	23	25	26	28	46	34	37	32
>55% of calories	6	9	10	26	10	17	25	41
Total Fat								
≤30% of calories	15	17	23	36	26	32	38	46
30 to<35% of calories	41	32	33	29	43	32	36	34
35 to <40% of calories	37	34	30	23	27	27	20	14
≥ 40% of calories	8	17	14	12	5	9	5	5
Saturated Fat								
≤10% of calories	8	13	25	34	23	31	43	51
10 to <15% of calories	85	72	60	52	70	61	52	39
≥ 15% of calories	7	15	15	14	6	8	5	9

[1] adjusted for intra-subject variability; based on food sources only

Source: BBCA E451311-007BV2

5.3.2 Micronutrient Recommendations

The Dietary Reference Intakes (DRI) are the new recommendations currently being developed by committees of American and Canadian scientists through a process administered by the Food and Nutrition Board of the Institute of Medicine, National Academy of Sciences. With these new requirement estimates, to the extent that evidence exists, the amounts associated with the reduction of risk of chronic disease are considered in the formulation, as well as the amount of a nutrient associated with the absence of a deficiency (Institute of Medicine, 2000a). One form of these recommendations is the Estimated Average Requirement (EAR). The EAR is the nutrient intake value that is estimated to meet the requirement defined by a specified indicator of adequacy of half of the healthy individuals in a life stage and gender group (Barr et al, 2002). Thus, the EAR exceeds the requirement of half of the group, but the remaining 50% of the specified group would not have its nutrient needs met. The EAR is suggested as a useful standard for evaluating prevalence of inadequacy of nutrient intakes of population groups (Institute of Medicine, 2000a; Carriquiry, 1999). We have applied the EAR cut-point method, which assesses the proportion of individuals in the group with inadequate intakes, a reflection of intakes below the EAR for each nutrient (Barr et al, 2002).

In the case of iron, the EAR cut point was not used for women, since the distribution is not symmetric, but is known to be skewed for menstruating women (Institute of Medicine, 2000a). Therefore the "the full probability approach" was applied, using the full distributions of requirement and intake to estimate the probability that individuals with a particular intake would not meet their requirement (Food and Nutrition Board, 1986). This approach has been used historically to assess iron (Anderson *et. al* ,1982). The analysis presented in this chapter uses the full probability approach, expanded to include uncertainty around the fraction of oral contraceptive users (Institute of Medicine, 2001) and uncertainty around the distribution of iron intakes due to sampling. In these calculations, self reported oral contraceptive use was estimated from the 229 PEI respondents aged 19-50 (non-pregnant, healthy) to the 1996-1997 National Population Health Survey (Statistics Canada, 1997). Specialized variance estimation software SUDAAN was used to take into account the uncertainty in oral contraception use, and the uncertainty around the intake distributions, accounting for the complex design of both surveys. The expanded method used a two dimensional Monte Carlo simulation to propagate the uncertainties through the probability approach.

There is currently insufficient evidence to calculate an EAR for calcium. In this situation, a value called an Adequate Intake (AI) is used instead. The AI is based on approximations of the average nutrient intakes, by a defined healthy group, that are assumed to be adequate (Barr et al, 2002). In the absence of definitive data on which to base an EAR, the group mean intake may be compared to the AI. If this intake exceeds the AI, there is likely a low prevalence of inadequate intakes. However, one cannot make conclusions concerning the prevalence of inadequacy when mean intakes are below the AI (Barr et al, 2002).

The estimated prevalence of inadequacy for selected nutrients is presented in Tables 5.10 and 5.11. In order to make comparisons, the data is presented using the same age groupings as are found in the DRI reports (Institute of Medicine, 1997; Institute of Medicine, 1998; Institute of Medicine, 2000b; Institute of Medicine, 2001). The confidence intervals and sample size for each age category are included in Tables G.6 and G.7 (see Appendix G). For all nutrients presented, the results for the oldest age group (71-74) must be interpreted with caution because of the low number of respondents in this age category. It is difficult to evaluate the adequacy of energy intakes in population based surveys, since energy requirements are influenced by basal metabolic rate, other metabolic factors and the level of physical activity, all of which are unique to each individual (Groff & Gropper, 2000). Results pertaining to energy intakes, weight status and physical activity are therefore discussed separately in Chapter 6. Vitamin A intakes could not be assessed for inadequacy, since the units used to describe the EAR (μg) are not comparable to the units in the 1991 Canadian Nutrient File (RE).

Few (<10%) of males had inadequate intakes of thiamin, riboflavin, niacin, vitamin B_{12} and phosphorus. Similar results were observed among females for riboflavin, niacin, and phosphorus. A higher proportion of women (1/4 to 1/3) had inadequate thiamin intakes, and 10% to 15% had inadequate vitamin B_{12} intakes.

Fewer men (13-39%) had inadequate zinc intakes compared with women, where 25-51% fell into this category. The prevalence of inadequate zinc intakes increased with age in men, although consistent age trends were not observed among women.

Folate was the nutrient most likely to be inadequate in the sample, with more than 95 per cent of females with inadequate folate intakes. Similarly, a high proportion of males (89-94%) had inadequate intakes.

Approximately half or more of males and females had inadequate intakes of vitamin C.

Less than 1/5 of males had inadequate vitamin B_6 intakes compared to 27-62% of women; the prevalence of inadequacy increased with age for this vitamin as well.

Magnesium was low in the diets of a high proportion of males; 47-78% had an inadequate intake for this nutrient. This mineral was a concern for an even greater number of women, with approximately three fourths or more of women having inadequate intakes.

The prevalence of inadequate iron intakes among women under 50 years of age was 29%; the prevalence was very low for all other age sex groups.

M121

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Table 5.10 Male Prevalence of Micronutrient Inadequacy[1]

	EAR[2]	19 to 30 yr %	31 to 50 yr %	51 to 70 yr %	71 to 74 yr %
Phosphorous	580 mg	0	0	0	0
Magnesium	330 mg (19-30 yr) 350 mg (31-70 yr)	47	68	76	78
Zinc	9.4 mg	13	15	24	39
Iron	6 mg[3]	<1		<1	
Thiamin	1 mg	3	8	10	6
Riboflavin	1.1 mg	0	1	3	9
Niacin	12 eq	0	0	0	0
Vitamin B_6	1.1 mg (19-50 yr) 1.4 mg (50+ yr)	5	6	19	21
Vitamin B_{12}	2 µg	3	5	5	5
Folate	320 µg	90	94	92	89
Vitamin C	75 mg	48	60	55	41

[1] intake below EAR; intake adjusted for intra-subject variability and based on food sources only

[2] Estimated Average Requirement, DRI Reports 1997 to 2001

[3] probability approach used to assess inadequacy

Source: BBCA E451311-007BV2

Table 5.11 Female Prevalence of Micronutrient Inadequacy[1]

	EAR[2]	19 to 30 yr %	31 to 50 yr %	51 to 70 yr %	71 to 74 yr %
Phosphorous	580 mg	4	7	5	4
Magnesium	255 mg (19-30 yr) 265 mg (31-70 yr)	77	79	73	81
Zinc	6.8 mg	31	25	29	51
Iron	8.1 mg (19-50 yr)[3] 5.0 mg (51+ yr)[3]	29		2	
Thiamin	0.9 mg	30	33	25	24
Riboflavin	0.9 mg	14	14	9	9
Niacin	11 eq	0	0	1	0
Vitamin B_6	1.1 mg (19-50 yr) 1.3 mg (50+ yr)	32	27	48	62
Vitamin B_{12}	2 µg	11	15	13	10
Folate	320 µg	99	98	97	96
Vitamin C	60 mg	58	58	47	44

[1] intake below EAR; intake adjusted for intra-subject variability and based on food sources only

[2] Estimated Average Requirement, DRI Reports 1997 to 2001

[3] probability approach used to assess inadequacy

Source: BBCA E451311-007BV2

Table 5.10 Male Prevalence of Micronutrient Inadequacy[1]

	EAR[2]	19 to 30 yr %	31 to 50 yr %	51 to 70 yr %	71 to 74 yr %
Phosphorous	580 mg	0	0	0	0
Magnesium	330 mg (19-30 yr) 350 mg (31-70 yr)	47	68	76	78
Zinc	9.4 mg	13	15	24	39
Iron	6 mg[3]	<1		<1	
Thiamin	1 mg	3	8	10	6
Riboflavin	1.1 mg	0	1	3	9
Niacin	12 eq	0	0	0	0
Vitamin B_6	1.1 mg (19-50 yr) 1.4 mg (50+ yr)	5	6	19	21
Vitamin B_{12}	2 µg	3	5	5	5
Folate	320 µg	90	94	92	89
Vitamin C	75 mg	48	60	55	41

[1] intake below EAR; intake adjusted for intra-subject variability and based on food sources only
[2] Estimated Average Requirement, DRI Reports 1997 to 2001
[3] probability approach used to assess inadequacy

Source: BBCA E451311-007BV2

Table 5.11 Female Prevalence of Micronutrient Inadequacy[1]

	EAR[2]	19 to 30 yr %	31 to 50 yr %	51 to 70 yr %	71 to 74 yr %
Phosphorous	580 mg	4	7	5	4
Magnesium	255 mg (19-30 yr) 265 mg (31-70 yr)	77	79	73	81
Zinc	6.8 mg	31	25	29	51
Iron	8.1 mg (19-50 yr) [3] 5.0 mg (51+ yr) [3]	29		2	
Thiamin	0.9 mg	30	33	25	24
Riboflavin	0.9 mg	14	14	9	9
Niacin	11 eq	0	0	1	0
Vitamin B_6	1.1 mg (19-50 yr) 1.3 mg (50+ yr)	32	27	48	62
Vitamin B_{12}	2 µg	11	15	13	10
Folate	320 µg	99	98	97	96
Vitamin C	60 mg	58	58	47	44

[1] intake below EAR; intake adjusted for intra-subject variability and based on food sources only
[2] Estimated Average Requirement, DRI Reports 1997 to 2001
[3] probability approach used to assess inadequacy

Source: BBCA E451311-007BV2

The AI and mean calcium intakes are presented in Table 5.12, along with the distribution of calcium intakes. There was a decline with age in the proportion of men and women with calcium intakes above the adequate intake (AI). Very low intakes of calcium were generally more prevalent among women, with 19-36% of women consuming less than 400 mg/day compared to less than 10% of males.

Mean calcium intakes exceeded the adequate intake (AI) only in young males (19-30 years), suggesting that intakes are likely adequate in this group (Fig 5.1). Although calcium intakes in all other age sex groups fell below the AI, we cannot conclude that these groups have inadequate intakes; while the AI is considered a goal for nutrient intakes, those below the AI may be adequate for a number of people (Barr et al, 2002).

Table 5.12 Distribution of Calcium Intake[1] (% of Individuals by Age and Sex)

	Males				**Females**			
	19 to 30 yr	**31 to 50 yr**	**51 to 70 yr**	**71 to 74 yr**	**19 to 30 yr**	**31 to 50 yr**	**51 to 70 yr**	**71 to 74 yr**
(n)	(194)	(353)	(373)	(78)	(183)	(381)	(358)	(73)
<400 mg	2	5	8	9	19	23	27	36
400 to <600 mg	11	20	27	24	27	31	37	31
600 to <800 mg	19	26	29	25	22	24	22	22
800 to <1000 mg	19	21	18	26	16	14	8	9
1000 to <1200 mg	20	13	12	9	8	7	3	3
≥1200 mg	29	15	7	8	8	2	2	<0.1
AI[2] (mg)	1000	1000	1200	1200	1000	1000	1200	1200
Mean Calcium[3] (mg)	1166	897	790	811	727	642	593	536

[1] adjusted for intra-subject variability; based on food sources only

[2] Adequate Intake, Health and Welfare Canada, 1990

[3] Intakes based on single day recalls from food sources only

Source: BBCA E451311-007BV2

The AI and mean calcium intakes are presented in Table 5.12, along with the distribution of calcium intakes. There was a decline with age in the proportion of men and women with calcium intakes above the adequate intake (AI). Very low intakes of calcium were generally more prevalent among women, with 19-36% of women consuming less than 400 mg/day compared to less than 10% of males.

Mean calcium intakes exceeded the adequate intake (AI) only in young males (19-30 years), suggesting that intakes are likely adequate in this group (Fig 5.1). Although calcium intakes in all other age sex groups fell below the AI, we cannot conclude that these groups have inadequate intakes; while the AI is considered a goal for nutrient intakes, those below the AI may be adequate for a number of people (Barr et al, 2002).

Table 5.12 Distribution of Calcium Intake[1] (% of Individuals by Age and Sex)

	Males				**Females**			
	19 to 30 yr	**31 to 50 yr**	**51 to 70 yr**	**71 to 74 yr**	**19 to 30 yr**	**31 to 50 yr**	**51 to 70 yr**	**71 to 74 yr**
(n)	(194)	(353)	(373)	(78)	(183)	(381)	(358)	(73)
<400 mg	2	5	8	9	19	23	27	36
400 to <600 mg	11	20	27	24	27	31	37	31
600 to <800 mg	19	26	29	25	22	24	22	22
800 to <1000 mg	19	21	18	26	16	14	8	9
1000 to <1200 mg	20	13	12	9	8	7	3	3
≥1200 mg	29	15	7	8	8	2	2	<0.1
AI[2] (mg)	1000	1000	1200	1200	1000	1000	1200	1200
Mean Calcium[3] (mg)	1166	897	790	811	727	642	593	536

[1] adjusted for intra-subject variability; based on food sources only
[2] Adequate Intake, Health and Welfare Canada, 1990
[3] Intakes based on single day recalls from food sources only

Source: BBCA E451311-007BV2

5.3.3 Fibre

Since a consensus regarding recommended dietary fibre intakes has not been established, the distribution of dietary fibre intakes is shown in Table 5.13. Approximately half of men consumed 15 g or more of fibre daily; this was higher than women where one third or less of women achieved this level in the diet. These findings are consistent with the higher mean intakes found in men compared to women (16.5 versus 12.6 g/day, respectively in Tables 5.1, 5.2). Among women, fibre intake appeared to increase with age. However, the number consuming more than 25 g/day was low in both men and women.

Dietary fibre intakes may be underestimated because the 1991 *Canadian Nutrient File* is incomplete for this dietary component. Although there are fibre values for principal food sources, 61% of dietary fibre values are missing from the 1991 version of the *Canadian Nutrient File* (Barr et al, 1994). Further, it is possible that consumption of fibre containing foods may vary among age and sex groups, which may differentially affect fibre estimates.

Table 5.13 Distribution of Dietary Fibre Intakes[1] (% of Individuals by Age and Sex)

	Males				Females			
Dietary Fibre Intake	**18 to 34 yr**	**35 to 49 yr**	**50 to 64 yr**	**65 to 74 yr**	**18 to 34 yr**	**35 to 49 yr**	**50 to 64 yr**	**65 to 74 yr**
(n)	(275)	(261)	(285)	(182)	(258)	(278)	(292)	(167)
<15.0 g/day	51	53	50	42	88	75	67	65
15 to <25 g/day	43	42	42	41	12	23	30	32
≥ 25.0 g/day	5	5	10	17	<1	2	3	3

[1] adjusted for intra-subject variability; based on food sources only

5.4 COMPARISON WITH PROVINCIAL NUTRITION SURVEYS

All provinces completed nutrition surveys in the 1990's using adult populations aged 18 to 74 and excluding persons living in institutions. All used 24-hour recall methodology with repeat interviews on a subsample to provide quantitative nutrient data. Means were used for comparison purposes since not all median values were available. The results are presented by age and sex groups, and were available for the following provinces:

- Prince Edward Island Nutrition Survey, conducted in 1995 (spring and fall), included 1,995 adults with 71% response rate and 29% repeat interviews
- Saskatchewan Nutrition Survey, conducted in 1993 (spring and winter), included 1,798 adults with 46% response rate and 20% repeat interviews (Stephen & Reeder, 2001). These results were not considered representative of the population.
- The Nova Scotia Nutrition Survey carried out in 1990 (spring and fall) involving 2,200 adults aged with 80% response rate and 38% repeat interviews (Nova Scotia Department of Health, 1993).
- Québec Nutrition Survey, conducted in 1990 (fall), which surveyed 2,118 adults with 69% response rate and 10% repeat interviews (Santé Québec, 1995).

Mean energy and nutrient intakes for the PEI Nutrition Survey (PE) and four other provincial nutrition surveys conducted in Saskatchewan (SK), Nova Scotia (NS) and Québec (QC) are presented in Table 5.14. Mean energy intakes in the PEI Nutrition Survey were comparable to those found in other provincial surveys. The distribution of energy intakes were similar across provinces (Table 5.15). Few men in any province had energy intakes less than 1000 kcal. Overall, the proportion of PEI women with similarly low energy intakes was less than 10% and was somewhat lower than found in Nova Scotia and Quebec.

The mean contribution of protein, carbohydrate and total fat to energy intake were consistent across provinces (Table 5.14). The proportion of men with fat intakes less than the recommended 30% of energy from fat was comparable across provinces, except for younger men (18-34) where there appeared to be a higher number in PEI (15%) and Saskatchewan (22%) compared to Québec and Nova Scotia, where only 3 and 7%, respectively, fell into this category of intake (Table 5.15). In women, the proportion of with fat intakes less than 30% of energy was comparable to other provinces. Average intakes of saturated fat as a % of energy were also comparable among provinces (Table 5.14). There was a general trend for a higher proportion of women across all age groups to consume the recommended <10% energy from saturated fat compared to findings from the Nova Scotia and Québec surveys (Table 5.15). There were no obvious differences in the number of males in this category among provinces.

As shown in Table 5.14, mean intakes of fibre were comparable to findings in Saskatchewan, Québec and Nova Scotia. Examination of the distribution of dietary fibre intake as the percentage above 15 g/day among the four provincial surveys, however, revealed some differences. Generally, the proportion of women over 35 with fibre intakes over 15 grams was comparable to Saskatchewan but higher than Nova Scotia. Young women were an exception, however, with only 12% consuming more than 15 g/day. This was comparable to the findings of the Nova Scotia Nutrition Survey. Similar to the findings of the Saskatchewan survey, fibre intakes among females were also considerably lower than in the Québec women. For example, in women 35-64, fibre intakes were 60 to 70% higher in Québec compared to PEI women. Similar fibre distributions were observed for men across age groups in the Québec and Saskatchewan surveys. A higher proportion of PEI males consumed 15 g of fibre or more per day compared to Nova Scotia males, although differences were less pronounced than for the females (Table 5.15).

Mean intakes of other nutrients were similar across the provinces, with a few exceptions (Table 5.14). In both sex groups, calcium intakes in PEI were similar to Nova Scotia and Québec but were lower than Saskatchewan. Mean intakes of iron among PEI adults were similar to those in the other provinces. Mean folate intakes were also similar between PEI and other provincial surveys except for Saskatchewan, where reported intakes were higher than those in PEI across age and sex categories.

Table 5.14 Mean Nutrient Intakes[1] in Provincial Nutrition Surveys

		Males				Females			
	Prov	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr
Energy (kcal)	PE	2859	2522	2311	2175	1789	1639	1609	1479
	SK[2]	3157	2721	2186	2116	1950	1767	1618	1423
	NS	3020	2343	2230	2025	1721	1571	1476	1394
	QC	2895	2632	2252	2143	1867	1727	1602	1512
Protein (% of calories)	PE	16.5	15.8	16.7	15.7	15.8	15.7	16.0	15.4
	SK[2]	15.9	16.7	16.4	16.0	14.8	15.9	16.1	16.0
	NS	16.0	16.0	17.0	16.0	16.0	17.0	17.0	17.0
	QC	15.9	15.9	16.5	16.3	16.1	16.6	16.4	16.6
Carbohydrate (% of calories)	PE	47.2	46.8	47.2	50.0	50.2	49.4	51.6	53.3
	SK[2]	50.1	47.2	48.4	48.2	52.9	48.7	51.1	52.1
	NS	46.9	45.3	47.4	49.7	51.8	48.4	49.3	52.0
	QC	45.0	46.0	45.0	49.0	48.0	47.0	49.0	51.0
		46.0	46.0	46.1	49.3	47.5	47.1	50.3	51.3
Total Fat (% of calories)	PE	34.1	35.4	34.8	33.4	33.4	34.0	31.6	31.0
	SK[2]	33.5	35.6	34.5	32.8	31.4	34.4	33.7	31.1
	NS	36.0	35.0	35.0	33.0	35.0	35.0	33.0	32.0
	QC	35.4	34.7	33.9	31.6	34.9	33.4	31.6	31.8
Saturated Fat (% of calories)	PE	12.6	12.6	12.3	11.4	11.9	11.7	10.7	10.7
	SK[2]	11.9	12.3	12.5	11.2	11.0	12.0	11.1	10.1
	NS	13.0	13.0	13.0	12.0	13.0	12.0	12.0	12.0
	QC	13.3	12.9	12.7	11.8	13.1	12.2	11.4	11.6
Dietary Fibre (g)	PE	16.4	16.1	16.7	18.3	11.5	12.5	13.9	13.9
	SK[2]	17.5	17.4	17.2	18.0	12.6	13.0	14.4	14.7
	NS	16.0	15.2	15.9	17.0	9.6	11.6	12.6	13.3
	QC	16.9	16.2	16.2	18.7	12.6	13.6	16.3	14.4
Calcium (mg)	PE	1151	838	791	785	714	637	600	547
	SK[2]	1251	994	793	812	822	761	651	633
	NS	1161	913	822	776	738	624	582	595
	QC	1114	922	736	771	788	658	622	574
Iron (mg)	PE	17.6	16.3	15.7	15.4	10.6	10.9	11.6	11.4
	SK[2]	18.6	17.4	15.4	15.2	12.1	11.6	11.5	10.4
	NS	17.7	15.0	14.9	15.0	10.7	10.7	10.7	10.2
	QC	18.0	16.9	14.9	15.6	11.9	11.7	11.9	10.4
Folate	PE	244	224	231	237	155	176	182	181
	SK[2]	290	260	243	243	200	197	207	188
	NS	263	238	234	243	162	176	189	182
	QC	272	246	235	254	203	189	205	180

[1] based on single day recalls from food sources only

[2] not representative of the Saskatchewan population

Table 5.15 Distribution of Macro-nutrient and Fibre Intakes[1] in Provincial Nutrition Surveys (% of individuals by age and sex)

	Prov	Males				Females			
		18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr
Energy <1000 kcal/d	PE	<1	<1	<1	<1	6	7	8	7
	SK[2]	<1	<1	3	1	2	7	4	9
	NS	<1	1	2	1	7	9	13	19
	QC	1	1	2	3	8	10	15	16
Energy 1000 to <1500 kcal/d	PE	3	3	6	10	28	36	41	48
	SK[2]	4	<1	10	14	18	33	42	50
	NS	4	9	7	15	31	41	50	51
	QC	5	7	13	14	25	35	32	42
Energy 1500 to <2000 kcal/d	PE	6	18	30	37	38	41	40	39
	SK[2]	10	10	27	33	43	31	41	37
	NS	12	24	32	41	44	40	30	23
	QC	13	14	26	34	29	24	33	30
Energy 2000 to <2500 kcal/d	PE	29	39	35	32	20	12	9	5
	SK[2]	19	34	30	35	27	23	11	4
	NS	23	31	34	29	15	9	5	4
	QC	19	22	26	24	22	20	14	7
Energy ≥2500 kcal/d	PE	62	40	29	21	8	3	3	1
	SK[2]	67	55	30	17	11	6	3	<1
	NS	61	35	25	14	3	1	2	3
	QC	62	55	34	25	16	12	7	5
Total Fat ≤30% of calories	PE	15	17	23	36	26	32	38	46
	SK[2]	22	22	27	33	42	25	32	41
	NS	7	15	19	32	18	25	41	51
	QC	3	19	19	45	17	25	35	47
Saturated Fat ≤10% of calories	PE	8	13.4	25.3	34	23.4	30.9	43	51
	SK[2]	22	13	26	41	37	24	40	55
	NS	7	17	20	32	16	22	35	44
	QC	8	13	17	39	16	25	32	38
Dietary Fibre ≥15 g	PE	47	46	50	58	12	24	33	35
	SK[2]	50	56	54	32	26	24	37	39
	NS	43	42	44	52	9	15	24	33
	QC	56	54	54	60	33	40	57	48

[1] adjusted for intra-subject variability; based on food sources only

[2] not representative of the Saskatchewan population

5.5 COMPARISON WITH NATIONAL CANADIAN SURVEYS

The first national survey of Canadian dietary habits, the Nutrition Canada survey, was conducted in 1970-1972 (Health and Welfare Canada, 1973). Table 5.16 includes a comparison of selected median nutrient intakes between the PEI Nutrition Survey in 1995 and the PEI sample of the Nutrition Canada Survey (Health and Welfare Canada, 1975). Comparisons with the Nutrition Canada survey are restricted by methodological differences including a different food and nutrient database (USDA, 1963) which reflect different analytical methods to obtain nutrient values and different density values to convert volumetric measures from food models to gram weights (Health and Welfare Canada, 1973). The effect of such differences on nutrient estimates is unclear. Further, Nutrition Canada had a 46% response rate, and used a smaller sample size of 300 . Islanders. For all nutrients presented for 1972, the results for the oldest age group (65-74 years) must be interpreted with caution because of the low number of respondents (33 males, 39 females) in this age category.

Table 5.16 PEI Nutrient Intake in 1995[1] and 1972[2] (Median[3] Intake by Age and Sex)

		Males			Females		
	Year	**20-39 yr**	**40-64 yr**	**65-74 yr**	**20-39 yr**	**40-64 yr**	**65-74 yr**
Energy	1995	2615	2214	2090	1712	1520	1411
(kcal)	1972	3364	3025	1936	1866	1826	1913
Fat [4]	1995	34.5	34.4	32.4	32.9	32	30.6
(% of calories)	1972	40.5	41.5	37.9	39.6	40.3	36.9
Protein	1995	100	89.2	82.6	64.8	61.9	55.8
(g)	1972	108	98.7	63.9	59.4	68.6	57.0
Calcium	1995	896	701	681	617	537	488
(mg)	1972	1138	792	694	540	639	692
Iron	1995	15.7	14.0	14.0	10.0	10.5	10.4
(mg)	1972	15.4	16.7	16.6	10.5	10.7	11.3
Vitamin A	1995	807	844	1009	530	598	809
(RE)	1972	1523	1124	1050	776	1014	902
Thiamin	1995	1.68	1.57	1.52	1.04	1.12	1.08
(mg)	1972	1.32	1.41	0.99	0.83	0.96	0.88
Vitamin C	1995	66	64	76	46	60	68
(mg)	1972	79	76	73	75	73	88

[1] PEI Nutrition Survey [2] Nutrition Canada Survey, PEI sample
[3] based on single day recalls from food sources only
[4] mean fat intake; Nutrition Canada Survey, Atlantic sample imputed as (mean fat g * 9)*100 / mean energy

Table 5.16 shows in general, energy and nutrient intakes among Islanders were lower in 1995 compared to the early 1970's. Protein intakes remained similar over the 23 year period. Overall fat intake appeared to decrease about 5 percentage points to 33% of calories in 1995. Decreased intakes of micronutrients including calcium, iron, vitamin A, and vitamin C was also noted. Only intake of thiamin increased over the 23 year period.

Since Nutrition Canada was conducted in the 1970's, there has been only one Canadian study which has attempted to include a nationally representative sample. The Food Habits of Canadians Survey(FHCS) (Gray-Donald et al, 2000), conducted in 1997-1998 for the Beef Information Centre, included 1,544 adults aged 18 to 65 years and used the 24 hour recall methodology, with a response rate of 30%. Results were compared with the Nutrition Canada survey.

There were some similarities between the changes over a generation noted by the PEI Nutrition Survey and the FHCS (Gray-Donald et al, 2000) including a decrease in Canadian energy intakes since the 1970's and an increase in thiamin intakes, although the increase in the latter was lower in the PEI Nutrition Survey compared to the FHCS (25% vs. 60%, respectively). In sharp contrast to the findings of the FHCS, intakes of all other micronutrients decreased in PEI adults compared to increased levels reported by Nutrition Canada. As well, the decrease in fat intake over a generation was less pronounced in the PEI Nutrition Survey, compared to the FHCS.

6

ENERGY INTAKE AND WEIGHT STATUS

The marked increase in the prevalence of obesity internationally has been labelled the "obesity epidemic" (Hill & Peters, 1998; Nestle & Jacobson, 2000). This is a concern, given that obesity is a risk factor for many chronic diseases, including cardiovascular disease, diabetes mellitus and some cancers (Groff & Gropper, 2000). Obesity results from an imbalance between energy intake and expenditure; specifically, when energy intake exceeds that expended through physical and metabolic activity. Body Mass Index (BMI) is commonly used to evaluate weight independent of height and has been found to correlate with mortality and morbidity and total body fat (Durazo-Arvizu et al, 1998). In order to evaluate body fat, it is recommended that waist hip ratio (WHR) data be used with body mass index data to characterize regional fat distribution, which has been associated with cardiovascular disease risk (Mansfield et al, 1999; Gibson, 1990) and diabetes (Seidell et al, 1997). Specifically, elevated WHR have been found to be associated with lower HDL cholesterol and higher total cholesterol, triglycerides and LDL cholesterol.

The primary objective of this chapter is to describe the weight status, fat distribution and energy intakes of adult Islanders. Also described are the associations between weight status, energy and fat intakes. Limited data on reported physical activity was also collected and is included in this chapter.

6.1 PROCEDURES

Energy intake was assessed using the 24 hour recall method described in Chapter 2.

Basal metabolic rates (BMR) for each person were calculated using the Schofield equation which considers age, height and weight (Schofield et al, 1985).

Weight was assessed without heavy clothing using portable spring scales which were calibrated weekly using a 20 lb weight. A standard measuring tape with a lock and a stainless steel footplate was used to measure standing height after removal of shoes. Circumferences were measured using a Lufkin Executive Diameter Tape. Waist girth was measured at the point of noticeable waist narrowing or between the ribs and iliac crest. Hip girth was measured at the level of greatest gluteal protuberance and the symphysis pubis.

Waist-hip ratio was calculated using the average of two waist measures, and the average of two hip measures. Height and weight measures were performed on 95% of respondents and used to derive the BMI. Waist and hip circumferences were assessed on 87% of respondents.

6.2 BODY MASS INDEX

Body Mass Index (BMI) is commonly used to evaluate weight independent of height and has been found to correlate with mortality and morbidity and total body fat (Durazo-Arvizu et al, 1998). BMI data are useful in comparing prevalence of overweight and obesity across populations, and to identify population groups at risk. Standards of interpretation for BMI vary (Health and Welfare Canada, 1988; Obesity Education Initiative Task Force, 1998; World Health Organization, 1998). For this report, we have utilized the standards from the World Health Organization (WHO) (World Health Organization, 1998), shown in Figure 6.1.

Figure 6.1 Body Mass Index

$$\text{BMI} = \text{weight (kg)} / \text{height}^2(\text{m}^2)$$

WHO Classification[1]	BMI	Risk of comorbidities
Underweight	<18.50	Low (but risk of other clinical problems increased)
Normal range	18.50-24.99	Average
Overweight	25.00-29.99	Increased
Obese Class I	30.00-34.99	Moderate
Obese Class II	35.00-39.99	Severe
Obese Class III	≥40.0	Very Severe

[1] World Health Organization, 1998

Body Mass Index (BMI) for the participants in the PEI Nutrition Survey is described in Table 6.1, using the WHO categories described in Figure 6.1, as well as the mean BMI values by age and sex.

The proportion considered overweight or obese (BMI> 25) by the WHO standards is 67% overall, with 73% males and 62% females falling into this category. Almost one third of the sample was considered obese (29%, 32% of males and females, respectively). There was a very low prevalence of underweight (BMI <18.50), although a higher proportion of women fell into this category compared to men.

More younger men appeared to fall into the "normal range" compared to men in other age groups. Men were more likely to be considered overweight compared to women (44% vs 30%, respectively). A higher proportion of men appeared to have mild, or Grade 1 obesity

M121

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compared to women. For both men and women, there appears to be a trend of increased mild obesity with age. More women were classified as having "very severe" obesity (Grade III) compared to men (11% vs 5%, respectively).

Table 6.1 PEI Body Mass Index[1], 1995 (Population percent by Age and Sex)

	Males				Females			
	18-34y	35-49y	50-64y	65-74y	18-34y	35-49y	50-64y	65-74y
(n)	(267)	(249)	(274)	(176)	(240)	(254)	(274)	(159)
% underweight	<1	<1	<1	1	2	<1	1	3
% normal	37	21	21	27	44	41	23	25
% overweight	43	45	44	40	24	29	39	32
% obese I	14	25	24	23	11	14	20	25
% obese II	3	4	5	6	7	5	7	6
% obese III	3	6	5	5	12	10	11	10
Mean BMI	26.4	28.4	28.5	27.9	26.8	26.6	28.8	28.7

[1] World Health Organization, 1998

PEI population estimates of BMI are also available for 1994/1995 using self-report data from the National Population Health Survey (NPHS) of 899 adult Islanders (Statistics Canada, 1995). For Islanders aged 20 to 64, the NPHS reports overweight or obese (BMI>25) rates of 66% and 47% for males and females, compared to the PEI Nutrition Survey rates of 73% and 61%, respectively. This demonstrates the under-reporting associated with the self-report method used by the NPHS (Boström & Diderichsen, 1997; Kuczmarski et al, 2001). The under-reporting is more evident when comparing rates of obesity (BMI>30) for Islanders aged 20 to 64, with the NPHS rates of 14% and 18% for males and females, compared to the PEI Nutrition Survey rates of 28% and 31%, respectively.

The WHO BMI standards used in this report are age independent and are the same for both sexes. However, the limitations of BMI must be considered when interpreting these results. Since BMI does not distinguish between body weight from fat versus weight from lean body mass, the relationship between BMI and body fat varies with body proportions. This relationship may also very with age in that the decrease in lean body mass with age may result in lower BMI values for older individuals compared to younger individuals with similar levels of body fat (Beck, 1998; Groff & Gropper, 2000; World Health Organization, 1998). Finally, misclassification is likely to occur among those with increased weight due to high levels of muscle mass (Jebb et al, 1993).

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	Males				Females			
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(n)	(267)	(249)	(274)	(176)	(240)	(254)	(274)	(159)
% underweight	<1	<1	<1	1	2	<1	1	3
% normal	37	21	21	27	44	41	23	25
% overweight	43	45	44	40	24	29	39	32
% obese I	14	25	24	23	11	14	20	25
% obese II	3	4	5	6	7	5	7	6
% obese III	3	6	5	5	12	10	11	10
Mean BMI	26.4	28.4	28.5	27.9	26.8	26.6	28.8	28.7

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The WHO BMI standards used in this report are age independent and are the same for both sexes. However, the limitations of BMI must be considered when interpreting these results. Since BMI does not distinguish between body weight from fat versus weight from lean body mass, the relationship between BMI and body fat varies with body proportions. This relationship may also very with age in that the decrease in lean body mass with age may result in lower BMI values for older individuals compared to younger individuals with similar levels of body fat (Beck, 1998; Groff & Gropper, 2000; World Health Organization, 1998). Finally, misclassification is likely to occur among those with increased weight due to high levels of muscle mass (Jebb et al, 1993).

6.3 WAIST HIP RATIO

Waist Hip Ratio (WHR) values were categorized into high and low risk categories according to age and sex specific norms from the Canada Fitness Survey (Health and Welfare Canada, 1981), with cutoffs corresponding to the 75th percentiles for age sex groups. This approach was used since it considers sex differences in pelvic structure and normal increases in WHR with age (Daniel et al, 1999), as is presented in Figure 6.2.

Figure 6.2 Waist Hip Ratio

WHR= waistgirth (cm) / hipgirth (cm)

⇩

High WHR cutoff[1] by age and sex:

	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr
Male	>0.89	>0.95	>0.98	>0.99
Female	>0.79	>0.82	>0.84	>0.86

[1] Daniel et al, 1999

The proportion of respondents with high waist hip ratio, and mean values by age and sex groups are shown in Table 6.2. Overall, 43% of Islanders have high WHR using age and sex specific standards described in Figure 6.2 (Daniel et al, 1999). The proportion of respondents with elevated WHR values appears similar across age and sex groups.

Table 6.2 PEI Waist Hip Ratio, 1995
(Population percent by Age and Sex)

	Males				Females			
	18-34y	35-49y	50-64y	65-74y	18-34y	35-49y	50-64y	65-74y
(n)	(247)	(227)	(245)	(155)	(218)	(243)	(261)	(148)
% high WHR[1]	48	45	42	41	42	39	46	41
Mean WHR	0.88	0.93	0.96	0.97	0.77	0.79	0.82	0.84

[2] Daniel et al, 1999

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(Population percent by Age and Sex)

	Males				Females			
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(n)	(247)	(227)	(245)	(155)	(218)	(243)	(261)	(148)
% high WHR[1]	48	45	42	41	42	39	46	41
Mean WHR	0.88	0.93	0.96	0.97	0.77	0.79	0.82	0.84

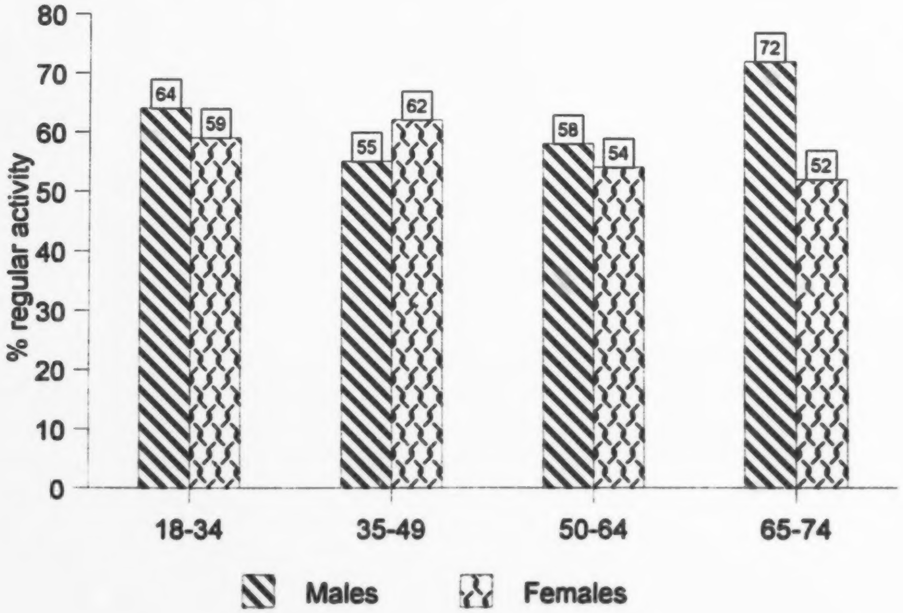
[2] Daniel et al, 1999

6.4 PHYSICAL ACTIVITY

Limited data on the reported physical activity of adult Islanders was also collected in the Nutrition and Health Questionnaire (Appendix A). The question on regular physical activity was taken from the Food and Drug Administration Health and Diet Survey (Levy et al, 1988). Respondents were asked to indicate if they exercised "regularly", defined as 20 minutes per day at least three times a week (Levy et al, 1988). Results of the assessment of reported physical activity according to age and sex groups are shown in Figure 6.4. More than half of the respondents reported regular physical activity. There was no evidence of age related patterns in reported activity. Although a high proportion (72%) of men 65-74 reported regular activity, this finding may not be accurate due to high variability in responses and a lower sample size in this group.

Respondents to the PEI Nutrition Survey appear more active than the PEI population when results were compared to those from the PEI sample of the NPHS (Statistics Canada, 1995). The NPHS used a lengthy series of questions to determine type and frequency of activity. The PEI Nutrition Survey results must be interpreted with caution due to the limitations of the method used to assess activity which required respondents to average the frequency of the exercise and did not consider exercise intensity.

Figure 6.3 **Reported Regular Physical Activity (Population percent by Age and Sex)**



6.5 COMPARISON OF ENERGY INTAKE TO EXPENDITURE

The ratio of energy intake to basal metabolic rate (BMR) is often used in population based studies (Goldberg et al, 1991; Shetty et al 1996; MacDiarmid & Blundell, 1998) to detect suspected under-reporting.

The formulae used to calculate the ratio of energy intake to BMR are shown in Figure 6.4. The ratio of energy intake to BMR approximates the physical activity level when energy intake approximates energy expenditure.

Figure 6.4 Calculation of Energy Intake to BMR Ratio

Basal Metabolic Rate (BMR in kcal) formulae[1] by age and sex:

	18 to 30 yr	>30 to 60 yr	over 60 yr
Male	(0.063 wt(kg) - 0.042 ht(m) + 2.953)* 238.846	(0.048 wt(kg) - 0.011 ht(m) + 3.670)* 238.846	(0.038 wt(kg) + 4.068 ht(m) - 3.491)* 238.846
Female	(0.057 wt(kg) + 1.184 ht(m) + 0.411)* 238.846	(0.034 wt(kg) + 0.006 ht(m) + 3.530)* 238.846	(0.033 wt(kg) + 1.917 ht(m) + 0.074)* 238.846

[1] Schofield, 1985

⇩

Energy Intake / BMR = Physical Activity Level

⇩

Physical Activity Level = 1.55 for sedentary persons[2]

95% lower limit[3] $= 1.55 * \text{antilog}\left\{-2 * \frac{27.4\%\ CV/100}{\sqrt{n}}\right\}$

Cut off = 0.896 for individuals with calculated BMR

[2] WHO, 1985

[3] Goldberg et al, 1991

Table 6.3 presents a comparison of mean energy intakes with the requirements of basal metabolism, using the formulae in Figure 6.4 The ratios reported in Table 6.3 likely represent some under-reporting of energy intake, since they are lower than levels needed for sedentary activity (1.55) (WHO, 1985). The EI:BMR ratio decreased with age, with the lowest values being observed in women over 50 years. This could be due to increased under-reporting of energy intake which has been positively associated with age (Zhang et al, 2000), decreased energy expenditure with age or problems with the method of assessing underreporting (MacDiarmid & Blundell, 1998).

Table 6.3 Reported Energy Intake and Estimated Energy Needs by Age and Sex

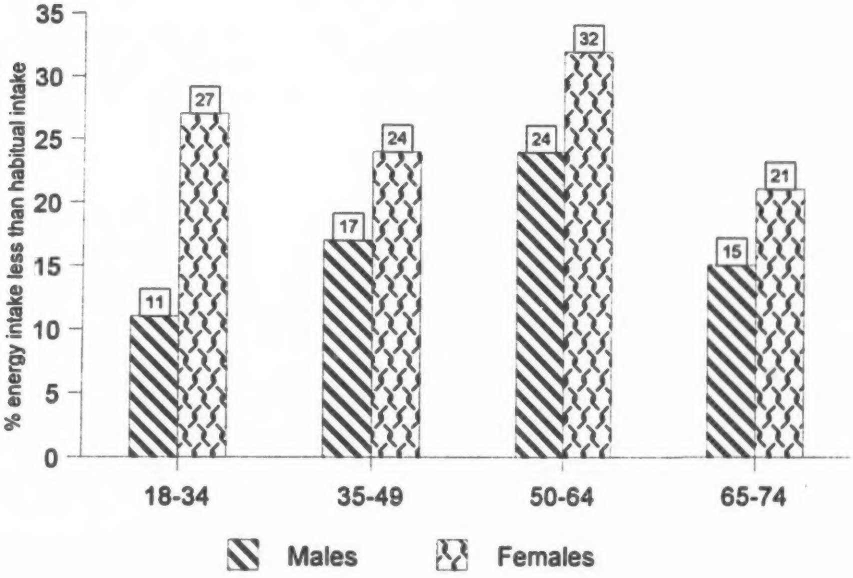
	Males				Females			
	18-34y	35-49y	50-64y	65-74y	18-34y	35-49y	50-64y	65-74y
(n)	(267)	(250)	(276)	(177)	(240)	(256)	(276)	(160)
Energy Intake[1] (kcal/d)	2859	2522	2311	2175	1789	1630	1610	1480
Basal Metabolic Rate (BMR)[2] (kcal/d)	1893	1868	1812	1593	1488	1403	1413	1305
Energy Intake/ BMR (ratio)	1.54	1.36	1.29	1.38	1.24	1.18	1.15	1.15

[1] mean intake based on single day recalls from food sources only
[2] Schofield, 1985

Figure 6.5 provides estimated under-reporting rates by age and sex using the cut-off shown in Figure 6.4. The cutoff lower limit takes into account the variation in energy intake, BMR formulae, and activity levels (Goldberg et al, 1991). Assuming that average activity levels are sedentary, 21% of the participants had reported energy intakes which fell below the cut-off. Generally, a higher proportion of females had intakes below the cut off compared to males, with younger males (18-34 yr) having the lowest number falling into this category. This is consistent with previous reports (MacDiarmid & Blundell, 1998).

There are a number of limitations in using this method, including inaccurate estimates from the standard BMR formula and controversy regarding the selection of a criterion for under-reporting. Classification problems are also a concern. For example, energy intakes below the EI:BMR cut off could arise from under-reporting (conscious or sub-conscious), or may be the result of true variability in day-to-day intake. Since energy intakes are based on single day recalls, intakes below the cut-off could in fact be accurate measures of intake which are at the lower end of a participant's normal range of habitual intake. Further, under-reporting can still occur among those with an energy intake to BMR ratio which appear to reflect valid intakes (MacDiarmid & Blundell, 1998). In spite of these limitations, EI:BMR ratios are considered a useful reference point provided that results are not overinterpreted (Black, 1997).

Figure 6.5 **Possible Under-reporting of Energy Intakes[1]** **(Population percent by Age and Sex)**



[1] Single day intake used to calculate 95% lower limit of EI:BMR for individuals; Goldberg et al, 1991

6.6 RELATIONSHIP BETWEEN ENERGY INTAKE AND BMI

Mean energy intakes (Tables 5.1, 5.2) and the distribution of energy intakes (Table 5.15) were reported in Chapter 5. The distribution of energy intakes were similar to those reported in other provincial nutrition surveys (Section 5.4). Approximately 7% of women reported low energy intakes (<1000 kcal); very few males had intakes in this category (Table 5.15). Comparisons of energy intake in 1995 with 1972 (Table 5.16) showed consistently lower intakes in 1995 compared to the early 1970's.

It is difficult to assess the adequacy of energy intakes in relation to need in population based surveys because requirements are affected by individual factors such as basal metabolic rate, efficiency of energy utilization and the degree of expenditure for a particular activity (Groff & Gropper, 2000; Health and Welfare Canada, 1988). Therefore, we have examined the association between BMI and energy intakes, which may provide some evidence as to whether Islanders are consuming energy above their requirements.

The mean energy intake according to BMI categories (World Health Organization, 1998) is shown in Table 6.4. For all age/sex groups, energy intake appears similar among normal, overweight, and obese categories. Caution is needed for the interpretation of the underweight category, due to the very small sample size. There was no clear relationship between BMI and energy intake. A recent review of observational studies also showed no consistent associations between food intake patterns and body mass index (Togo et al, 2001).

Mean fat intakes as a per cent of calories according to the BMI categories (World Health Organization, 1998) is shown in Table 6.4. Fat intake appears similar among age groups, sexes, and BMI categories. Caution is needed for the interpretation of the underweight category, due to very small sample size. These findings are consistent with the review by Togo et al (2001), which indicated that the relationship between food intake patterns categorized as "fatty sweet or energy dense" and BMI is inconsistent, with 10 studies reporting a positive association and 4 other studies reporting a negative association. Under-reporting may be a factor in these findings, since there is evidence that obese individuals tend to selectively under-report high fat foods (Macdiarmid & Blundell, 1998).

Table 6.4 Mean Energy and Fat Intake[1] by BMI[2]

	Males				Females			
	18-34y	35-49y	50-64y	65-74y	18-34y	35-49y	50-64y	65-74y
(n)	(267)	(250)	(276)	(177)	(240)	(256)	(276)	(160)
Energy Intake (kcal)								
underweight					1560			1666
normal	2977	2501	2270	2111	1814	1627	1697	1420
overweight	2885	2481	2300	2211	1855	1678	1629	1527
obese	2583	2587	2349	2153	1715	1596	1535	1464
Fat Intake (% of calories)								
underweight					33.9			26.9
normal	34.5	35.0	34.2	32.6	32.6	33.7	29.6	29.2
overweight	33.6	34.4	33.7	33.2	34.1	32.9	31.2	30.9
obese	33.8	36.0	34.4	31.1	32.2	32.2	31.5	31.6

[1] Intakes based on single day recalls from food sources only

[2] Body Mass Index, World Health Organization, 1998

7 FREQUENCY OF FOODS CONSUMED

This chapter presents the results from the food frequency questionnaire (Appendix A), which assessed the frequency of consumption of selected foods over the past month.

7.1 MEASURING FOOD FREQUENCY

Food frequency questionnaires (FFQ) are designed to obtain information on long-term or usual dietary habits. FFQ are commonly used in epidemiological studies because of their ease of use, relative low cost, low respondent burden (Thompson & Byers, 1994). This method allows for the ranking of food consumption from most frequently consumed to least frequently consumed.

The instrument used in the PEI Nutrition Survey was based on that used in the Nova Scotia and Alberta Nutrition Surveys and allowed for the recording of consumption of the number of portions of selected food items on a daily, weekly, or monthly basis. The instrument was semi-quantitative in that a specified portion size was assigned for each food/food group (Thompson & Byers, 1994). The PEI Nutrition Survey was the first provincial survey to capture separate information on the serving size and frequency of consumption for each food line entry which allows for the calculation of a prorated daily value for each respondent. Although it is generally held that the frequency of consumption contributes the most to the variation in total food consumed (Heady 1961, Willett, 1994), studies comparing correlations between FFQ and diet records or recalls indicate modest improvements in the performance of FFQ with the addition of serving sizes (Willett, 1994; Sobell et al, 1989). Difficulties in estimating usual portion sizes have been identified as a source of error with the FFQ method (Thompson & Byers, 1994) we utilized standard food portion models to assist respondents in recalling portions and reduce this source of error. When respondents preferred to use a different food portion model than that specified, amounts were converted to the standard portion specified so that portion units were consistent across respondents.

The food list used for the PEI Nutrition Survey was adapted from that used in the Alberta, Saskatchewan and Nova Scotia Nutrition Surveys and included foods which are sources of nutrients implicated in chronic disease (fat, β-carotene, cruciferous vegetables). Foods added to the Alberta Nutrition Survey listing included lobster and shellfish (cooked with and without fat), potatoes (other than french fries), and bread (whole wheat and white). Although some of these foods are unlikely to contribute to total fat intake, it is important to include foods which will be recognized and identified by the majority of participants. Foods excluded from the Alberta Nutrition Survey food listing because of expected low consumption in the PEI population include wild game items. Finally, types of milk listed were modified to include those commonly sold in PEI (e.g. triple milk, 20/80 spread). The final food listing contained 43 foods or groups of foods.

The food list used was limited and was not intended to provide a comprehensive assessment of representatives from the various food groups in Canada's Food Guide for Healthy Eating. We cannot calculate the number of servings consumed for each food group, compare servings consumed to the recommended number for each food group from Canada's Food Guide for Healthy Eating, or assess the contribution of individual foods to nutrient intakes. These findings will be addressed in a separate report using the 24 hour recall data. Other sections of the FFQ, which address the frequency of meals eaten outside the home; main types of fats used in home fried foods and home baked foods; fat spreads on breads, potatoes or vegetables; common methods of cooking meat, poultry and fish; consumption of visible fat/skin and gravy with meat or poultry; and types of salad dressings, will be presented in a separate publication.

This chapter presents the mean number of portions of selected foods consumed by adult Islanders, according to the Canada's Food Guide for Healthy Eating Food group to which they belong. Confidence Intervals for the mean values shown are included in Appendix H. Figures shown are pro-rated number of portions consumed per day which considers the portion size noted on the questionnaire, how often the respondent consumed the food item(s) and the proportion of the sample consuming the food in the past month. When interpreting the results below, it is important to consider that differences observed between age/sex groups may reflect one or a combination of these factors.

M121

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7.2 CONSUMPTION OF VEGETABLES

The list of vegetables assessed was limited to those considered good dietary sources of β- carotene and/or cruciferous vegetables; fruit intake was not assessed. As a result, it is not possible to compare amounts consumed to the recommended 5-10 servings of fruits and vegetables a day.

The mean portions of selected vegetables consumed by age and sex groups are shown in Table 7.1. Overall, Islanders consumed a higher number of portions of plain potatoes (baked, boiled or mashed) than any other type of potato. French fry and fried potatoe consumption appeared to decrease with age in both women and men. Carrots were the next most commonly consumed vegetable among those assessed, with a gradual increase in consumption with age. Women appeared to consume more portions of broccoli than men, although there was no consistent pattern across age groups. In the entire sample, spinach and squash were consumed in the lowest amounts on a daily basis compared to other vegetables assessed.

Table 7.1 Consumption of Selected Vegetables (Mean number of daily portions, by age and sex)

	Portion Size	Males				Females			
		18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr
Potatoes									
bake/boil/mash	1 cup	0.53	0.45	0.62	0.70	0.28	0.33	0.49	0.53
fried	1 cup	0.40	0.26	0.16	0.08	0.21	0.11	0.09	0.05
other with milk	1 cup	0.18	0.19	0.18	0.12	0.16	0.14	0.15	0.18
Carrots	½ cup	0.41	0.44	0.49	0.56	0.39	0.44	0.54	0.56
Broccoli	½ cup	0.09	0.11	0.12	0.10	0.10	0.16	0.14	0.13
Cabbage	½ cup	0.10	0.13	0.12	0.13	0.07	0.10	0.12	0.14
Cauliflower	½ cup	0.03	0.04	0.05	0.05	0.05	0.06	0.07	0.06
Spinach									
cooked	½ cup	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.03
raw	½ cup	0.02	0.01	0.02	0.01	0.02	0.02	0.01	0.02
Squash	½ cup	0.01	0.01	0.01	0.02	0.00	0.01	0.01	0.02

7.2 CONSUMPTION OF VEGETABLES

The list of vegetables assessed was limited to those considered good dietary sources of β- carotene and/or cruciferous vegetables; fruit intake was not assessed. As a result, it is not possible to compare amounts consumed to the recommended 5-10 servings of fruits and vegetables a day.

The mean portions of selected vegetables consumed by age and sex groups are shown in Table 7.1. Overall, Islanders consumed a higher number of portions of plain potatoes (baked, boiled or mashed) than any other type of potato. French fry and fried potatoe consumption appeared to decrease with age in both women and men. Carrots were the next most commonly consumed vegetable among those assessed, with a gradual increase in consumption with age. Women appeared to consume more portions of broccoli than men, although there was no consistent pattern across age groups. In the entire sample, spinach and squash were consumed in the lowest amounts on a daily basis compared to other vegetables assessed.

Table 7.1 Consumption of Selected Vegetables (Mean number of daily portions, by age and sex)

		Males				Females			
	Portion Size	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr
Potatoes									
bake/boil/mash	1 cup	0.53	0.45	0.62	0.70	0.28	0.33	0.49	0.53
fried	1 cup	0.40	0.26	0.16	0.08	0.21	0.11	0.09	0.05
other with milk	1 cup	0.18	0.19	0.18	0.12	0.16	0.14	0.15	0.18
Carrots	½ cup	0.41	0.44	0.49	0.56	0.39	0.44	0.54	0.56
Broccoli	½ cup	0.09	0.11	0.12	0.10	0.10	0.16	0.14	0.13
Cabbage	½ cup	0.10	0.13	0.12	0.13	0.07	0.10	0.12	0.14
Cauliflower	½ cup	0.03	0.04	0.05	0.05	0.05	0.06	0.07	0.06
Spinach									
cooked	½ cup	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.03
raw	½ cup	0.02	0.01	0.02	0.01	0.02	0.02	0.01	0.02
Squash	½ cup	0.01	0.01	0.01	0.02	0.00	0.01	0.01	0.02

7.3 CONSUMPTION OF MEAT AND ALTERNATIVES

Foods assessed from the Meat and Alternatives group included beef, pork, processed meats, poultry, eggs, fish and shellfish. The mean portions of selected meat and alternatives consumed by age and sex groups are shown in Table 7.2. Men, especially younger men, appeared to consume a higher number of portions of beef steak/roasts, bacon and luncheon meats per day than women. It is important to note that these differences do not take into account the higher total food intake of men compared to women. Nevertheless, these observations are consistent with past research which indicates a higher preference for these foods among men compared to women (Letarte et al, 1997; Logue et al, 1988). All beef consumption decreased with age in men and women except for steaks and roasts which remained stable across age groups in women (Table 7.2). Older men and women (65-74) had the lowest number of daily portions (<0.10) of ground beef and hamburgers. The number of portions of fish and shellfish was considerably lower than for all other types of meat and alternatives. A higher number of daily portions of poultry cooked without frying was observed in both men and women compared to fried poultry, although consumption of the latter was higher in men than women. The mean number of portions of eggs consumed daily was also higher in men compared to women and decreased with age. When interpreting these results, it is important to consider that all portion sizes are not equivalent in nutrient content. For example, portion amounts of bacon, luncheon meat and hot dogs/sausage are less than those used for beef, poultry and fish.

Table 7.2 Consumption of Selected Foods from the Meat and Alternatives Group (Mean number of daily portions, by age and sex)

		Males				Females			
	Portion Size	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr
Beef									
steak/roast	74 g	0.58	0.52	0.50	0.39	0.27	0.29	0.31	0.31
ground beef	74 g	0.28	0.21	0.13	0.09	0.20	0.16	0.13	0.08
hamburgers	74 g	0.38	0.20	0.13	0.08	0.16	0.11	0.07	0.05
Pork									
bacon	1 strip	0.59	0.61	0.53	0.50	0.29	0.28	0.24	0.29
ham/chops	74 g	0.33	0.33	0.30	0.29	0.19	0.19	0.20	0.18
Processed Meats									
luncheon meat	30 g	0.74	0.55	0.34	0.20	0.29	0.28	0.17	0.09
hot dogs/sausage	1 unit	0.38	0.27	0.19	0.16	0.18	0.12	0.09	0.08
Poultry									
not fried	74 g	0.38	0.38	0.35	0.29	0.31	0.31	0.33	0.30
fried	74 g	0.17	0.13	0.09	0.05	0.10	0.07	0.04	0.02
Eggs	1 egg	0.46	0.48	0.42	0.37	0.21	0.22	0.21	0.20
Seafood									
fish, not fried	74 g	0.15	0.13	0.18	0.23	0.10	0.14	0.15	0.17
fish, fried	74 g	0.19	0.17	0.18	0.16	0.09	0.09	0.09	0.09
shellfish, no butter	½ cup	0.05	0.06	0.05	0.03	0.03	0.02	0.03	0.02
shellfish, with butter	½ cup	0.05	0.04	0.04	0.03	0.03	0.03	0.02	0.02
lobster, no butter	½ cup	0.04	0.04	0.03	0.03	0.02	0.03	0.02	0.04
lobster, with butter	½ cup	0.02	0.03	0.02	0.01	0.01	0.01	0.02	0.01

Table 7.2 Consumption of Selected Foods from the Meat and Alternatives Group (Mean number of daily portions, by age and sex)

		Males				Females			
	Portion Size	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr
Beef									
steak/roast	74 g	0.58	0.52	0.50	0.39	0.27	0.29	0.31	0.31
ground beef	74 g	0.28	0.21	0.13	0.09	0.20	0.16	0.13	0.08
hamburgers	74 g	0.38	0.20	0.13	0.08	0.16	0.11	0.07	0.05
Pork									
bacon	1 strip	0.59	0.61	0.53	0.50	0.29	0.28	0.24	0.29
ham/chops	74 g	0.33	0.33	0.30	0.29	0.19	0.19	0.20	0.18
Processed Meats									
luncheon meat	30 g	0.74	0.55	0.34	0.20	0.29	0.28	0.17	0.09
hot dogs/sausage	1 unit	0.38	0.27	0.19	0.16	0.18	0.12	0.09	0.08
Poultry									
not fried	74 g	0.38	0.38	0.35	0.29	0.31	0.31	0.33	0.30
fried	74 g	0.17	0.13	0.09	0.05	0.10	0.07	0.04	0.02
Eggs	1 egg	0.46	0.48	0.42	0.37	0.21	0.22	0.21	0.20
Seafood									
fish, not fried	74 g	0.15	0.13	0.18	0.23	0.10	0.14	0.15	0.17
fish, fried	74 g	0.19	0.17	0.18	0.16	0.09	0.09	0.09	0.09
shellfish, no butter	½ cup	0.05	0.06	0.05	0.03	0.03	0.02	0.03	0.02
shellfish, with butter	½ cup	0.05	0.04	0.04	0.03	0.03	0.03	0.02	0.02
lobster, no butter	½ cup	0.04	0.04	0.03	0.03	0.02	0.03	0.02	0.04
lobster, with butter	½ cup	0.02	0.03	0.02	0.01	0.01	0.01	0.02	0.01

7.4 CONSUMPTION OF MILK PRODUCTS

The mean portions of selected milk products consumed by age and sex groups are shown in Table 7.3. Young men consumed the highest number of portions of milk as a beverage in the sample, with close to 2 portions a day on average. Again, we have not considered the higher total food intake in men in the interpretation of these results. Younger women also appeared to consume more milk than their older counterparts, although about half the amount of young men. Milk was much more likely to be consumed as a beverage compared to on cereal, although the number of portions of milk on cereal increased with age. However, given the smaller amount normally consumed on cereal compared to the amount consumed as a beverage, this increase is unlikely to compensate for the decrease in milk consumption as a beverage. Men reported a higher number of daily portions of cheese of all types and ice cream compared to women. Overall, mean daily portions of lower fat yogurt (1% butter fat or less) appeared greater than reported for higher fat products in women 35-64. However, more mean portions of higher fat cheeses (>24% BF) and ice creams were consumed than the lower fat versions of these products. This may reflect a lower availability of lower fat cheeses and other dairy products in PEI at the time of the survey. Overall, women consumed more yogurt than men.

Table 7.3 Consumption of Selected Milk Products (Mean number of daily portions, by age and sex)

		Males				Females			
	Portion Size	**18 to 34 yr**	**35 to 49 yr**	**50 to 64 yr**	**65 to 74 yr**	**18 to 34 yr**	**35 to 49 yr**	**50 to 64 yr**	**65 to 74 yr**
Milk									
as a beverage	1 cup	1.94	1.02	0.79	0.83	1.05	0.62	0.51	0.45
on cereal	1 cup	0.97	0.51	0.39	0.42	0.53	0.31	0.26	0.22
Cheese									
>24% BF	74 g	0.17	0.16	0.14	0.12	0.13	0.11	0.12	0.10
10-24% BF	30 g	0.17	0.12	0.10	0.10	0.12	0.11	0.13	0.13
<10% BF	60 g (¼ cup)	0.02	0.01	0.02	0.02	0.02	0.04	0.03	0.03
Ice Cream									
regular	½ cup	0.34	0.32	0.31	0.31	0.15	0.14	0.13	0.17
low fat	½ cup	0.05	0.03	0.02	0.01	0.04	0.02	0.03	0.03
Yogurt									
<1% BF	½ cup	0.03	0.03	0.03	0.03	0.04	0.09	0.09	0.05
>1% BF	½ cup	0.04	0.02	0.02	0.03	0.04	0.04	0.05	0.04

7.4 CONSUMPTION OF MILK PRODUCTS

The mean portions of selected milk products consumed by age and sex groups are shown in Table 7.3. Young men consumed the highest number of portions of milk as a beverage in the sample, with close to 2 portions a day on average. Again, we have not considered the higher total food intake in men in the interpretation of these results. Younger women also appeared to consume more milk than their older counterparts, although about half the amount of young men. Milk was much more likely to be consumed as a beverage compared to on cereal, although the number of portions of milk on cereal increased with age. However, given the smaller amount normally consumed on cereal compared to the amount consumed as a beverage, this increase is unlikely to compensate for the decrease in milk consumption as a beverage. Men reported a higher number of daily portions of cheese of all types and ice cream compared to women. Overall, mean daily portions of lower fat yogurt (1% butter fat or less) appeared greater than reported for higher fat products in women 35-64. However, more mean portions of higher fat cheeses (>24% BF) and ice creams were consumed than the lower fat versions of these products. This may reflect a lower availability of lower fat cheeses and other dairy products in PEI at the time of the survey. Overall, women consumed more yogurt than men.

Table 7.3 Consumption of Selected Milk Products (Mean number of daily portions, by age and sex)

		Males				Females			
	Portion Size	**18 to 34 yr**	**35 to 49 yr**	**50 to 64 yr**	**65 to 74 yr**	**18 to 34 yr**	**35 to 49 yr**	**50 to 64 yr**	**65 to 74 yr**
Milk									
as a beverage	1 cup	1.94	1.02	0.79	0.83	1.05	0.62	0.51	0.45
on cereal	1 cup	0.97	0.51	0.39	0.42	0.53	0.31	0.26	0.22
Cheese									
>24% BF	74 g	0.17	0.16	0.14	0.12	0.13	0.11	0.12	0.10
10-24% BF	30 g	0.17	0.12	0.10	0.10	0.12	0.11	0.13	0.13
<10% BF	60 g (¼ cup)	0.02	0.01	0.02	0.02	0.02	0.04	0.03	0.03
Ice Cream									
regular	½ cup	0.34	0.32	0.31	0.31	0.15	0.14	0.13	0.17
low fat	½ cup	0.05	0.03	0.02	0.01	0.04	0.02	0.03	0.03
Yogurt									
<1% BF	½ cup	0.03	0.03	0.03	0.03	0.04	0.09	0.09	0.05
>1% BF	½ cup	0.04	0.02	0.02	0.03	0.04	0.04	0.05	0.04

The type of milk consumed was also assessed and is described in Table 7.4. The most common type of milk consumed was 2%, with an average of 0.58 cups per day. Consumption of whole, 1% and skim milk was very similar with about 0.18 cups of each being consumed daily. On average, 1.1 cups of milk a day were consumed.

Table 7.4 Types of Fluid Milk Consumed

	Mean number of daily portions[1] of Milk		
	as a beverage	on cereal	total fluid milk
whole milk	0.137	0.029	0.166
2% milk	0.481	0.098	0.579
1% milk	0.136	0.037	0.173
skim milk	0.143	0.041	0.184
buttermilk	0.002	n/a	0.002
cream	n/a	<0.001	<0.001
triple milk (undiluted)	<0.001	<0.001	<0.001
triple milk (dilution ratio 2:1)	0.018	0.005	0.023
triple milk (other dilution)	0.013	0.002	0.015
whole evaporated milk	<0.001	0.002	0.002
whole evap milk (diluted)	<0.001	0.001	0.001
2% evaporated milk	<0.001	<0.001	<0.001
2% evap milk (diluted)	<0.001	<0.001	<0.001
skim evaporated milk	<0.001	<0.001	<0.001

[1] portion = 1 cup

7.5 CONSUMPTION OF GRAIN PRODUCTS

The mean number of portions of selected grain products assessed are listed in Table 7.5. There were some notable differences between women and men, with women consuming fewer mean daily portions of white bread and cookies, donuts, cakes, pies, muffins and croissants compared to men across all age groups. Consumption of whole wheat bread appeared to increase with age in males, but mean number of daily portions of whole wheat bread was still less among older males than white bread (1.22 versus 2.06, respectively).

When interpreting these findings, it is important to consider that portion sizes represent one unit of grain product (e.g. 1 slice of bread or 1 cookie) which are not necessarily equivalent in nutrient content. This sometimes makes direct comparisons of portions consumed among food items difficult. For example, although the mean number of portions of crackers consumed appears similar to the amount of other grain products consumed (e.g. cookies and whole wheat bread), the portion size used for crackers is one cracker, which may not represent the amount normally consumed in one eating episode. If the calculation utilized a larger number of units (e.g. 6-8) which would be equivalent in nutrient content to a slice of bread, the values would be less than presented.

Table 7.5 Consumption of Selected Grain Foods
(Mean number of daily portions, by age and sex)

		Males				**Females**			
	Portion Size	**18 to 34 yr**	**35 to 49 yr**	**50 to 64 yr**	**65 to 74 yr**	**18 to 34 yr**	**35 to 49 yr**	**50 to 64 yr**	**65 to 74 yr**
White bread	1 slice	2.9	2.7	2.3	2.1	1.4	1.3	1.2	1.3
Whole wheat bread	1 slice	0.7	0.9	1.1	1.2	0.6	1.0	1.1	1.0
Crackers	1 cracker	1.1	1.2	1.6	1.5	1.4	1.0	1.1	1.7
Cookies	1 cookie	1.2	1.2	1.4	1.3	0.5	0.7	0.7	1.2
Donuts/cakes/pies/ muffins/croissants	1 piece	0.5	0.6	0.6	0.6	0.3	0.4	0.4	0.5

7.5 CONSUMPTION OF GRAIN PRODUCTS

The mean number of portions of selected grain products assessed are listed in Table 7.5. There were some notable differences between women and men, with women consuming fewer mean daily portions of white bread and cookies, donuts, cakes, pies, muffins and croissants compared to men across all age groups. Consumption of whole wheat bread appeared to increase with age in males, but mean number of daily portions of whole wheat bread was still less among older males than white bread (1.22 versus 2.06, respectively).

When interpreting these findings, it is important to consider that portion sizes represent one unit of grain product (e.g. 1 slice of bread or 1 cookie) which are not necessarily equivalent in nutrient content. This sometimes makes direct comparisons of portions consumed among food items difficult. For example, although the mean number of portions of crackers consumed appears similar to the amount of other grain products consumed (e.g. cookies and whole wheat bread), the portion size used for crackers is one cracker, which may not represent the amount normally consumed in one eating episode. If the calculation utilized a larger number of units (e.g. 6-8) which would be equivalent in nutrient content to a slice of bread, the values would be less than presented.

Table 7.5 Consumption of Selected Grain Foods (Mean number of daily portions, by age and sex)

	Portion Size	Males				Females			
		18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr	18 to 34 yr	35 to 49 yr	50 to 64 yr	65 to 74 yr
White bread	1 slice	2.9	2.7	2.3	2.1	1.4	1.3	1.2	1.3
Whole wheat bread	1 slice	0.7	0.9	1.1	1.2	0.6	1.0	1.1	1.0
Crackers	1 cracker	1.1	1.2	1.6	1.5	1.4	1.0	1.1	1.7
Cookies	1 cookie	1.2	1.2	1.4	1.3	0.5	0.7	0.7	1.2
Donuts/cakes/pies/muffins/croissants	1 piece	0.5	0.6	0.6	0.6	0.3	0.4	0.4	0.5

8 NUTRITION AND HEALTH ATTITUDES

This chapter presents information on attitudes related to nutrition and health. The information is derived from both the Nutrition and Health Questionnaire, and the Food Frequency Questionnaire described in Chapter 2 (Appendix A).

8.1 HEALTH RELATED ATTITUDES

Attitudes and beliefs have been found to influence food choice (Shepherd & Stockley, 1987), in addition to other factors which are sensory, cultural and environmental in nature (Rozin, 1995). Identifying population segments according to attitudes towards foods, nutrition and health can improve the effectiveness of nutrition education interventions (Contento et al, 1988).

Three questions assessed respondents' attitudes regarding nutrition and health. One question assessed the perceived benefit of reducing risk factors for heart disease, including losing weight, lowering blood pressure and eating fewer high fat foods. A second question required respondents to indicate whether they were choosing or avoiding foods because of a general concern about their health, chronic diseases such as heart disease or cancer or because of their nutrient content (e.g. fibre or fat content). A further query assessed the perceived importance of various health behaviours.

Also examined were sources of health information. Respondents were asked to indicate how much information they got from various sources such as physicians, grocery store handouts, and Canada's Food Guide to Healthy Eating.

The association between health related attitudes and food use was not examined as part of the report; this will be the subject of future publications. Between 98.5% and 99.5% completed the questions in the Nutrition and Health Questionnaire; all respondents completed the Food Frequency Questionnaire.

8.2 ATTITUDES ON HEALTH AND DISEASE PREVENTION

Respondents' attitudes regarding reducing risk factors for heart disease was assessed using a series of questions in the Nutrition and Health Questionnaire (Appendix A). The source of this item was the Food and Drug Administration Health and Diet Survey (Levy et al, 1988). The perceived benefit of the effect of reducing risk factors for heart disease is shown in Table 8.1. Over 90% of respondents indicated that taking the actions listed, including weight reduction, reducing cigarette smoking and making dietary changes, would have a "moderate or large" effect in preventing heart disease. An equally high proportion of men and women believed that reducing smoking would have a large effect in preventing heart disease, although more older women than men fell into this category (88 vs 76%, respectively). Generally, a higher proportion of women than men indicated that they believed changing the other health behaviours listed would have a "large effect" in preventing heart disease. Sex differences were most pronounced with dietary changes, with more women than men appearing to hold the view that eating fewer high fat and high cholesterol foods would have a "large effect" in preventing heart disease. In all, results suggest that PEI adults have heard the messages about the risk factors for heart disease.

Respondents were also asked to indicate whether they were choosing or avoiding foods in order to improve their health or prevent chronic disease, as part of the food frequency questionnaire described in Chapter 7. Results of this question are shown in Table 8.2. Overall, 62% of respondents are choosing or avoiding foods or types of foods because they are concerned about maintaining or improving their health. Many Islanders are choosing or avoiding foods or types of foods due to a concern about heart disease (41%), high blood pressure (31%), cancer (29%), or osteoporosis (24%).

Generally, a higher proportion of females than males indicated that they were basing their food choices on health concerns, particularly for concerns related to "maintaining or improving health", "weight gain" and "osteoporosis". Sex differences were most obvious for the latter, with more than 40% of women over 35 choosing or avoiding foods because of concerns related to osteoporosis compared to 7-18% of men. This likely reflects public health and marketing campaigns in the 1990s which emphasized the role of diet in osteoporosis. These findings are similar to those of the Tracking Nutrition Trends survey (National Institute Nutrition, 1997) which indicated that women express more concern than men about specific nutrition issues such as calcium (80% vs 54%). Young men appeared the least likely of all age sex groups to be making food choices based on health related concerns.

For the majority (56%) of respondents, food choices were influenced by concerns about weight gain. A higher proportion of females than males indicated that they choose or avoid foods due to a concern about their weight. Similar to our findings, Alexander & Tepper (1995) have reported that women are more likely to have taken action to improve their eating habits in order to meet weight related goals, whereas younger males are more likely to want to gain weight (Alexander & Tepper, 1995). Interestingly, a very low proportion (6%) of the sample reported that they were actually following a low calorie diet.

Table 8.1 Beliefs About Actions to Prevent Heart Disease (Population percent, by age and sex)

	Males				Females			
	18-34y	35-49y	50-64y	65-74y	18-34y	35-49y	50-64y	65-74y
(n)	(272)	(260)	(278)	(181)	(257)	(276)	(289)	(165)
Reduce smoking								
little or no effect	2	2	3	6	3	3	4	2
moderate effect	16	12	15	18	16	10	13	10
large effect	82	86	82	76	81	87	83	88
Lower high blood pressure								
little or no effect	2	2	1	4	2	1	3	3
moderate effect	22	16	19	28	17	15	13	23
large effect	76	82	80	67	82	84	84	73
Lower high blood cholesterol								
little or no effect	4	2	3	5	2	0	3	4
moderate effect	23	26	28	21	21	20	18	15
large effect	73	72	69	74	77	79	79	80
Weight loss								
little or no effect	4	3	5	6	2	2	5	7
moderate effect	28	28	26	33	19	19	21	25
large effect	68	69	69	61	73	79	74	68
Eat fewer high fat foods								
little or no effect	3	3	4	4	1	1	3	1
moderate effect	34	33	27	27	23	22	19	20
large effect	63	64	69	69	76	77	78	79
Eat fewer high cholesterol foods								
little or no effect	4	4	6	6	1	2	3	5
moderate effect	36	34	30	30	28	23	21	15
large effect	60	61	64	64	71	75	76	81

Table 8.2 Choosing or Avoiding Foods Due to Health Concerns (Population percent, by age and sex)

	Males				Females			
	18-34y	35-49y	50-64y	65-74y	18-34y	35-49y	50-64y	65-74y
(n)	(275)	(261)	(282)	(182)	(258)	(278)	(292)	(167)
Maintaining or improving health	42	53	64	66	60	77	77	79
Weight gain	40	45	49	47	69	72	67	57
Heart disease	22	41	47	55	27	51	61	57
High blood pressure	17	27	37	46	24	36	41	53
Cancer	15	26	28	33	19	42	50	37
Osteoporosis	7	9	15	18	24	43	48	45

8.3 PERCEIVED IMPORTANCE OF HEALTH BEHAVIOURS

The perceived importance of various health behaviours was assessed using a series of questions in the Nutrition and Health Questionnaire (Appendix A). The source of this question was the USDA Diet and Health Knowledge Survey (Sapp & Jensen, 1997). Respondents were asked to indicate on a 4 point scale labelled "very important" to "not at all important" how important behaviours such as the use of fat, salt and eating a variety of foods were to them personally. The results are found in Table 8.3, with the response categories of "not too important" and "not at all important" combined into one category "not important".

Overall, more than half of respondents believe that it is very important to them personally to maintain a healthy weight (72%), choose a diet with plenty of fruits and vegetables (65%), eat a variety of foods (62%), choose a diet low in fat (56%), and/or use salt or sodium in moderation (51%). In general, a higher proportion of females, particularly older females, indicated that all dietary behaviours assessed were more important to them personally compared to males. There were also differences in the perceived importance of dietary behaviours with age: older respondents appeared to be more likely to indicate that the dietary behaviours assessed were "very important" compared to younger respondents. Differences with age were less striking for dairy products.

Respondents were also asked to indicate whether they were choosing or avoiding foods based on nutrient content, as part of the food frequency questionnaire. Results of this question are shown in Table 8.4. Overall, total and saturated fat content were identified most often by respondents as a reason for food choice (64 and 51% , respectively). Almost half of the sample (49%) indicated that they were choosing foods because of the fibre or the unsaturated fat content. Sugar appears to be somewhat less of a concern than fat with 41% of respondents indicating that they are avoiding foods because of the sugar content.

There appeared to be some sex differences in health related attitudes. More females than males were choosing foods because of the nutrient content, with more than 2/3 women over 35 indicating that this was a consideration in their food choices (Table 8.4). This is consistent with past studies where women and older adults had higher ratings for general health attitudes (Roininen et al, 1999; National Institute Nutrition, 1997) and women expressed higher interest in eating reduced fat foods and a lower fat diet (Stafleu et al, 1994; Shepherd & Stockley, 1985; Brug et al. 1994; National Institute Nutrition, 1997).

Table 8.3 Perceived Importance of Health Behaviours (Population percent, by age and sex)

	Males				Females			
	18-34y	35-49y	50-64y	65-74y	18-34y	35-49y	50-64y	65-74y
(n)	(272)	(260)	(278)	(181)	(257)	(276)	(289)	(165)
Maintain a healthy weight								
very important	59	63	70	75	76	79	84	83
somewhat important	33	29	19	17	21	18	12	15
not important	8	7	10	8	3	3	4	2
Eat plenty of fruits and vegetables								
very important	46	51	64	78	66	81	80	82
somewhat important	35	34	26	15	29	17	16	15
not important	20	14	6	7	5	2	4	3
Eat a variety of foods								
very important	46	55	58	63	61	78	77	77
somewhat important	40	35	33	28	31	19	19	16
not important	13	9	10	9	8	3	5	7
Eat less fat								
very important	35	45	56	64	56	68	77	82
somewhat important	39	36	27	22	36	23	17	14
not important	26	19	17	14	8	8	6	5
Use salt in moderation								
very important	29	47	54	56	45	66	65	72
somewhat important	38	26	32	28	33	23	24	20
not important	33	27	15	16	22	11	10	8
Eat less cholesterol								
very important	30	37	54	61	41	58	68	79
somewhat important	40	39	27	23	43	32	25	13
not important	30	24	19	17	16	11	8	8
Eat adequate fibre								
very important	24	37	51	65	36	64	72	71
somewhat important	38	36	28	22	41	27	20	17
not important	38	27	21	14	23	9	8	11
Eat at least two servings of dairy products daily								
very important	41	32	39	49	54	57	56	55
somewhat important	32	41	35	31	31	27	30	27
not important	27	27	26	20	15	16	14	19
Use less saturated fat								
very important	24	37	48	52	40	59	66	66
somewhat important	38	36	33	30	44	32	25	25
not important	38	27	19	18	16	9	9	9
Eat plenty of breads, cereals, rice, and pasta								
very important	35	37	38	53	49	54	51	49
somewhat important	41	45	40	30	41	35	35	32
not important	24	18	22	17	10	12	14	19
Use sugar in moderation								
very important	25	36	44	53	37	55	56	66
somewhat important	39	39	35	31	42	35	33	23
not too important	28	19	16	14	17	8	8	10
not at all important	9	5	5	2	4	2	2	1

Table 8.4 Choosing or Avoiding Foods Based on Nutrient Content (Population percent, by age and sex)

	Males				Females			
	18-34y	35-49y	50-64y	65-74y	18-34y	35-49y	50-64y	65-74y
(n)	(275)	(261)	(282)	(182)	(258)	(278)	(292)	(167)
Choose for nutrient content	35	40	36	46	51	71	65	68
Choose for fibre content	26	44	49	60	41	62	73	65
Choose for unsaturated fat content	24	36	51	55	47	63	72	65
Avoid fat content	47	54	63	68	67	73	80	78
Avoid saturated fat content	31	38	52	58	51	64	70	67
Avoid cholesterol content	25	40	45	53	38	52	66	64
Avoid salt content	28	47	52	58	40	52	61	70
Avoid sugar content	30	32	37	46	40	49	54	63

8.4 SOURCES OF DIETARY INFORMATION

Respondents were asked to indicate how much information they got from various sources such as physicians and grocery store handouts, with responses being recorded on a 3 point scale labelled “a lot” to “none”. This question, from the Food and Drug Administration Health and Diet Survey (Levy et al, 1988), was adapted to specify local health organizations on PEI. Respondents were also asked to indicate if they had heard of Canada's Food Guide to Healthy Eating, and how they used the guide. This question was used in the Alberta and Nova Scotia Nutrition Surveys.

Sources of dietary information are shown in Table 8.5. Respondents indicated that food labels or packaging (28%) and news stories and news programs (28%) were the major sources of information. Health organizations (27%), and physicians and other health providers (21%) were the next most used sources of nutrition information. This is similar to the findings of the Tracking Nutrition Trends survey (National Institute Nutrition, 1997) which found that the top two sources of nutrition information were product labels and radio/tv programs. The majority of the respondents (63%) indicated that they did not get any nutrition information from grocery store handouts or displays. This may have changed since the PEI Nutrition Survey was conducted in 1995, because several grocery store chains have included dietitians on their staff, and have increased in-store nutrition promotion information, since that time.

When asked if they had ever seen or heard about the Canada's Food Guide to Healthy Eating, 60% said yes. However, only 21% of Islanders (more women than men) indicated that they actually use the food guide. This is lower than the 31% of Canadians who indicated that they eat according to the Food Guide in 1994 (National Institute Nutrition, 1994). The majority of respondents who do use the food guide are using it to plan and choose meals at home (60%), another 14% use the food guide for shopping, 13% use it for choosing foods in restaurants, and 13% had other uses.

Table 8.5 Sources of Dietary Information (Population percent, by age and sex)

	Males				Females			
	18-34y	35-49y	50-64y	65-74y	18-34y	35-49y	50-64y	65-74y
(n)	(272)	(259)	(280)	(180)	(257)	(276)	(290)	(165)
Food labels								
a lot of information	19	15	18	12	44	41	38	29
a little information	46	38	30	31	38	42	41	41
no information	35	47	52	57	19	17	21	30
News stories and programs								
a lot of information	26	23	22	18	33	37	28	23
a little information	53	51	45	45	54	49	48	41
no information	21	26	33	37	13	15	24	36
Non-government organizations[1]								
a lot of information	21	23	25	17	25	41	33	30
a little information	38	35	31	34	40	38	31	24
no information	42	42	43	49	35	21	37	47
Physicians and other health providers								
a lot of information	15	15	20	21	23	27	28	33
a little information	33	39	40	40	46	39	37	31
no information	52	46	40	38	31	35	35	36
Use Canada's Food Guide	13	12	11	11	29	35	28	22
Food advertisements								
a lot of information	13	8	5	4	18	15	11	11
a little information	59	50	42	41	63	54	50	36
no information	29	42	53	56	19	31	39	53
Grocery store displays								
a lot of information	4	4	1	1	4	3	5	3
a little information	24	23	20	18	49	51	39	33
no information	72	73	79	81	47	46	57	63

[1] Heart Health, Heart & Stroke Foundation, Partners for Living, Canadian Cancer Society

9 DISCUSSION

This report includes the core results of the PEI Nutrition Survey. We have presented results corresponding to the objectives identified in Chapter 1, which include the estimation of the distribution of dietary intakes of macro and micro nutrients and the identification of population sub-groups at nutritional risk based on dietary intakes. The report also includes a description of the weight status of adult Islanders, as well as preliminary information on the food consumption patterns based on the food frequency questionnaire data. Comparisons among age and sex groups discussed below are observational and are not based on statistical testing.

We achieved a 71% response rate, which compares favourably to other provincial surveys and to large American dietary surveys. A comparison of the sample characteristics to the PEI population suggest that while there are some differences (e.g. smokers may be under-represented), there was no systematic bias evident in the sample. It is reasonable to conclude that our estimates of inadequacies are somewhat conservative i.e. nutritional inadequacies are likely somewhat more prevalent than the estimates provided.

Analysis of nutrient intakes indicate a number of nutritional concerns among adults in PEI. Excessive total fat intakes were common among participants, with mean intakes in all age/sex groups exceeding the recommended 30% of calories from fat. It is noteworthy that fewer men achieved fat intakes at this recommended level (1/5-1/3), and more appeared to have excessive fat intakes (>40% of calories) compared to women. Intakes of saturated fat followed similar trends, with less than 10% of young men consuming below the recommended 10% energy from saturated fat. Analysis of food use data suggests that males consume a higher number of mean portions of fatty foods such as bacon, luncheon meat and french fries. However, further analysis is needed to determine whether this finding merely reflects the higher overall food intakes in this group rather than true sex differences in the use of these specific foods. Further, although both men and women consumed more higher fat cheeses and regular or rich ice creams than products of lower fat content, and 2% milk was the most common fluid milk consumed, we do not know the extent to which these foods contributed to the overall high fat intake. The more frequent consumption of higher fat dairy products may reflect a lower availability of lower fat cheeses and other dairy products in PEI at the time of the survey.

Most adult Islanders (95% of women and 90% of men) have intakes of folate which fell below the estimated average requirement for this vitamin. However, the PEI Nutrition Survey was carried out in 1995, prior to mandatory fortification of flour with folacin introduced by Canada in November 1998. The current number of Islanders meeting the recommend levels of this vitamin may be higher now. Further analysis of the potential impact of fortification on folate adequacy is warranted. Magnesium was also a concern for large numbers of Islanders, particularly among women. Approximately half of

Islanders had inadequate vitamin C intakes. This, combined with the low folate and magnesium intakes, suggests that fruit and vegetable consumption is low. Since the food frequency questionnaire was not designed to assess vegetable and fruit use, analysis of food use using the 24 hour recall data is needed in order to draw conclusions regarding fruit and vegetable use by PEI adults.

Calcium intakes appear to be a significant concern in PEI adults based on a comparison with adequate intakes (AI), defined by the current dietary reference intakes. Very few older men and women (>50 years) (8% and 1%, respectively) had calcium intakes above the AI. The population group most likely to consume sufficient calcium appeared to be young males, although only half of this group had intakes which met or exceeded the AI. Results of the food frequency assessment are consistent with this finding, suggesting that intake of milk also declined with age in both women and men, with only young men consuming close to the recommended 2-4 servings of milk daily.

Inadequate iron intakes were a concern only for women under 50, where one third consumed inadequate levels of this mineral in their diet. This finding reflects the higher requirement for iron for women in this age group, and suggests that these women need to increase their dietary iron by selecting such foods as lean meats and legumes more often.

The prevalence of inadequate vitamin B_6 intakes increased with age, although women were generally more likely to have inadequate intakes of this vitamin compared men. Similarly, a high proportion of women (25-51%) had inadequate zinc intakes compared to men, where (13-39%) fell into this category. There was in increase in the prevalence of inadequate zinc intakes with age in men, although this trend were not observed among women. These findings suggest a need to increase consumption of food sources of these nutrients, including meats, shellfish and grains.

Fish and shellfish consumption was very low in the sample, which is consistent with results of a recent study of PEI women utilizing a food frequency methodology, which indicated that fish and shellfish consumption was very low among PEI women (Knight et al, 2001). Factors explaining food use were not addressed by this survey; however, the low fish consumption may reflect cost and availability factors. Although PEI is a major producer of shellfish such as mussels and lobster, the high cost and restricted seasonal availability of the latter may explain the low intake of fish, particularly for the fall season of data collection. Although males appeared to be more likely to consume higher fat meats and a higher mean number of portions of grain products and milk, results must be interpreted with caution due to limitations in the method used to assess food use, and the fact that results do not consider the higher overall food intake in men.

Men were more likely to consume foods containing dietary fibre than women, where more than 2/3 of Islanders had intakes less than 15 g/day. Although there is no current consensus regarding recommended fibre intakes, it would be prudent to recommend that Islanders increase their consumption of dietary fibre since very few men or women reported intakes which exceeded 25 g/day which has been associated with health benefits.

Analysis of height and weight data suggests that overweight is a significant problem among PEI adults, with 50% of the total sample having Body Mass Index (BMI) values over 27, a value associated with increased risk of hypertension, hyperlipidemia and coronary heart disease. Application of more recent BMI standards from the World Health Association yielded considerably higher estimates of those considered overweight or obese (67% overall, with 73% males and 62% females falling into this category). Approximately one third of the sample was considered obese (BMI>30), which greatly exceeds the 15% calculated using self reported rather than actual weights (Statistics Canada, 1995). The public health implications of applying the newer WHO standards is not without controversy. While there is international agreement concerning the cut-offs to define obesity (BMI>30) (Kuczmarski & Flegal, 2000), the newer cut-offs for overweight (BMI 25.0-29.0) have been criticized as being associated with either no or modest elevated mortality risk (Strawbridge et al, 2000). Further, concern has been expressed that the new standards will lead to labeling and stigmatizing of too many as overweight. Public health recommendations should consider the guidelines accompanying the new BMI standards which suggest that health professionals recommend weight loss to those in the overweight category only when they have two or more cardiovascular risk factors or if they indicate a desire to lose weight.

Results also indicate that a significant proportion (43%) of adult Islanders have elevated waist hip ratios(WHR), associated with increased risk for chronic diseases such as cardiovascular disease and diabetes. Men aged 18-34 had the highest proportion of respondents with elevated WHR but had appeared to have the lowest rate of overweight based on BMI cutoffs. It is difficult to interpret these findings based on these preliminary analyses. It is important to look at the proportion of respondents with both elevated WHR and BMI levels in order to get clearer picture of health risks associated with excess body weight and body fat distribution.

While high energy intakes may be assumed to be a major contributor to overweight, there was no clear association between BMI and energy intake. This finding may be partially explained by differing activity levels if those with lower BMIs consumed similar levels of energy in their diets but were more physically active. Further statistical analysis and a more comprehensive measure of physical activity would be necessary in order to assess the role of physical activity in the observed findings. A second possible explanation pertains to under-reporting. The lower intakes among those with higher BMI values may in fact reflect under-reporting in this group since there is evidence that overweight individuals are more likely to under-report (Zhang et al, 2000; Klesges et al, 1995; Johnson et al, 1998). However, not all studies support this conclusion (Myers et al, 1988; McDiarmid & Blundell, 1998). Preliminary analysis (reported in Section 6.5) indicate that energy intakes may be under-reported in 21% of the sample. Other factors which have been associated with under-reporting, but were not examined for this report, include socio-economic status, smoking and education level (Johnson et al, 1998; MacDiarmid & Blundell, 1998). Finally, heterogeneity of food intakes has been identified as a factor in failing to observe an association between BMI and food intake (Togo et al, 2001).

Comparisons with other provincial surveys suggest that estimations of nutrient intakes are similar. However, these comparisons were based on intake values provided in reports, and differences and trends noted in Chapter 5 have not been confirmed with statistical analysis using original data.

In general, energy and nutrient intakes among Islanders were lower in 1995 compared to the early 1970's. Intake of nutrients such as calcium, iron, vitamin A, and vitamin C have decreased over a generation. These decreases are in contrast to the findings of the recent Food Habits of Canadians Survey. PEI fat intakes have decreased over a generation, but still remain above the recommended level of 30% of calories from fat.

Examination of health related attitudes indicated that the majority of adult Islanders believe that it is very important to them personally to maintain a healthy weight, choose a diet with plenty of fruits and vegetables, eat a variety of foods, choose a diet low in fat, and use salt in moderation. The nutrient most likely to influence food choice was fat content. Over 90% of respondents believe that making positive health changes such as reducing smoking, altering their diet, or losing weight would have a moderate or large effect in preventing heart disease. However, few Islanders (6%) actually reported following a weight loss diet at the time of the survey. Women appeared to be more likely than men to believe that making positive dietary changes (reducing fat, cholesterol or achieving weight loss) would prevent heart disease and were most likely to be choosing foods due to concerns related to osteoporosis, weight gain or to maintaining or improving health. Not all these concerns were reflected in actual food choices, however, since low calcium intakes were common, especially among women.

Age differences in attitudes were also observed, with positive health concerns, including the belief that fruits and vegetables and fibre consumption are very important, being more prevalent in older groups and among women. This was consistent with lower fat intakes for these subgroups, but, once more, did not translate into higher calcium or folate intakes, particularly among women.

There are obvious inconsistencies between the high prevalence of positive health attitudes and the high prevalence of overweight and obesity and inadequate nutrient intakes. Although PEI adults have heard the messages about the risk factors for heart disease, they have not translated this awareness into action. Since we have assessed health related attitudes rather than actual nutrition knowledge, we cannot conclude that Islanders have no need of further information on health related topics. Clearly, there is a need to assess knowledge in adults and to design appropriate nutrition and health interventions which target behaviour and/or knowledge rather than attitudinal change.

The major sources of nutrition information were food labels, news stories, and health organizations. While women in particular get information from food labels, this will not increase fruit and vegetable consumption. Although the majority of adult Islanders had seen or heard of Canada's Food Guide for Healthy Eating, only 1/5 (21%) actually use it, which is lower than the national average of 31%.

Survey results have identified possible target groups for health promotion interventions. Dietary intake and attitudinal results support the conclusion that dietary fat reduction should be a focus of future nutrition interventions for all adult Islanders. Young men in particular should be targeted with nutrition education messages designed to reduce fat intake and increase fruits and vegetables. Women of all ages need to be encouraged to consume more vegetables and fruit and milk while keeping fat intakes at a lower level. The increased prevalence of inadequate zinc and vitamin B_6 in older adults suggests that this group should be encouraged to increase food sources of these nutrients, such as meats, shellfish and grain products. Overweight is a serious public health concern among Islanders, particularly among men 35-49 years.

Future Directions

The PEI Nutrition Survey has generated a vast amount of information which will be the subject of further analyses. Objectives not addressed in this report, which will be the subject of future publications, include the contribution of the major food groups to nutrient intakes and the assessment of food insufficiency attributable to inadequate resources . Food group analysis was completed in Quebec, Nova Scotia and Saskatchewan Nutrition Surveys with variations in how food groupings were defined. Currently, a common list of food groupings are being defined for use by provincial surveys conducted since 1995. Food group analysis will be conducted once these are finalized and included in a separate report. Secondly, information regarding food insecurity was assessed in the sample. This data will be analysed and will be the subject of a separate publication.

Further analysis of meal patterns is recommended, including contribution of individual meals and snacks to energy and nutrient intakes and the frequency of consumption of food groups at meals versus snacks. In addition, an examination of the proportion of population subgroups consuming various food items using the 24 hour recall data would be informative. Information on the type of nutrient supplements was also collected in this study; this will be analysed at a later date, including the impact of supplements on dietary adequacy.

A preliminary examination of under-reporting indicates that this may be a concern in approximately 1/5 of the sample, with higher rates among women. A more extensive analysis of other factors associated with and the significance of under reporting in the sample is warranted.

10 CONCLUSIONS

- The Prince Edward Island Nutrition Survey is the first province wide survey to be conducted since the 1970's, when the Nutrition Canada survey was carried out. This report has provided important descriptive information regarding the food and nutrient intakes of 1,995 adult Islanders and a description of the weight status of adult Islanders. The 71% response rate minimizes the effect of non-response bias. The PEI Nutrition Survey provides a slightly optimistic representation of the dietary intake of adult Islanders, and conservative estimates of nutritional inadequacies.

- Analysis of nutrient intakes indicate a number of nutritional concerns among adults in PEI, including excessive total fat and saturated fat intakes. Men, particularly younger men, were less likely to consume the recommended fat intakes (30% of calories) and were more likely to have excessive fat intakes (>40% of calories) compared to women.

- Most adult Islanders (95% of women and 90% of men) have intakes of folate below the estimated average requirement for this vitamin. Since the PEI Nutrition Survey was carried out prior to fortification of flour with folacin, the current proportion of Islanders with inadequate folate intakes is likely lower. Further analysis of the potential impact of fortification on folate adequacy is needed.

- Magnesium intakes were also a concern for three quarters of Islanders surveyed. Approximately half of the sample had inadequate vitamin C intakes. The combination of low folate, magnesium, and vitamin C intakes suggests that fruit and vegetable consumption is low. Confirmation of this will be required by conducting an analysis of food use using the 24 hour recall data.

- Calcium intakes appear to be a significant concern for PEI adults. Very few older men and women over 50 years (8% and 1%, respectively) had calcium intakes above the "adequate intake" defined by the current dietary reference intakes. Food use data suggest that this may reflect low consumption of milk which declined with age in both women and men, with only young men consuming close to the recommended 2-4 servings of milk daily.

- Iron was a concern only for women under 50, where one third consumed inadequate levels of this mineral in their diet. This reflects the higher need for iron in this age group, and suggests that these women should increase their dietary iron by selecting such foods as lean meats and legumes more often.

- The increasing prevalence of inadequate zinc and vitamin B_6 intakes with age suggests a need to increase consumption of food sources of these nutrients, including meats, shellfish and grains.

- Nutrient intakes, for the most part, are similar to those in other provincial surveys. Energy and nutrient intakes were lower than those reported by the Nutrition Canada survey conducted in the 1970's.

- Height and weight data suggests that overweight is a significant problem among PEI adults: 67% were overweight or obese (73% males and 62% females). Approximately one third of adult Islanders were considered obese (BMI>30), which greatly exceeds the 15% obesity rate calculated using self reported rather than actual weights (Statistics Canada, 1995). The increased risk of many Islanders for chronic diseases such as cardiovascular disease and diabetes was confirmed by the high proportion (43%) of adult Islanders with excess fat in the abdominal area.

- The majority of adult Islanders believe that it is very important to them personally to engage in positive health behaviours such as maintaining a healthy weight, choose a diet with plenty of fruits and vegetables or one that is low in fat. Women appeared to be more likely to believe that making dietary changes would have a large effect in preventing heart disease and were also more likely to base their food choices on health concerns, particularly a concern about weight gain. The preponderance of positive health attitudes is inconsistent with the high rate of overweight and obesity in the population and suggests that health attitudes are not a reliable predictor of weight status.

- There is a need for public health interventions designed to reduce the high rate of obesity in the province as well as the high prevalence of excess fat and inadequate nutrient intakes. Since these initiatives should reduce the risk of chronic disease among Islanders, they should be part of the provincial Chronic Disease Reduction Strategy. In particular, because of the significant challenges involved in managing adult obesity, it is important that children be targeted with prevention programs through the existing Healthy Eating Alliance and the Active Living Alliance. Such interventions are most likely to be successful if they are part of a comprehensive approach, which includes a nutrition policy component.

- The results of the Prince Edward Island Nutrition Survey will provide, for the first time in over two decades, data critical for planning appropriate health promotion policies and programs in the province. Moreover, dietary information obtained will serve as a baseline for future nutrition monitoring efforts, including the Canadian Community Health Survey, which is expected to include a nutrition component in 2004.

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APPENDICES

APPENDIX A
Survey Instruments

Form B	24 Hour Recall Form
Form C	Food Frequency Questionnaire
Form D	Health Questionnaire
Form E	Demographic Profile

FORM B

FACILITATOR # ☐☐

Identifier Number ☐☐☐☐☐

PRINCE EDWARD ISLAND NUTRITION SURVEY
24 HOUR RECALL

TIME 00:01 23:59	REST/ CAFE. *	MEAL/ SNACK **	HOME PREP. ***	FOOD DESCRIPTION	SALT	# OF PORTIONS	MODEL	THICK-NESS

* Restaurant/Cafeteria
C = cafeteria
F = fast food
R = restaurant (table service)
T = take-out outlet, deli
V = vending machine, snack bar

** Meal/Snack
BK = breakfast
L = lunch
D = dinner(supper)
BC = brunch
S = snack, in-between meals

*** Homemade
H = home made baked products made from scratch or a mix in your own home.
E =homemade baked products made from scratch or a mix elsewhere than in your own home.

Did you prepare most of the foods you ate yesterday? Yes __ No __ (1)
FOR INTERVIEWER ONLY:
In the interview, was the respondent assisted by the person who prepared the meals?
Yes__ No __ N/A __ (2)
Did the respondent have prior knowledge that a 24 hour recall would be taken?
Yes __ No __ (3)

NUTRIENT SUPPLEMENT FORM

1. Did you take any vitamin or mineral supplements in last month? ☐ Yes ☐ No
2. Please tell me all vitamin or mineral supplements with their DIN (when available) that you took during the last month.
3. How often was each of these supplements taken during the last month? [Number of times per day, per week or per month]
4. How many pills (capsules, etc.) were usually taken on each occasion?
5. Yesterday, how many pills were taken?

SUPPLEMENT NAME	DIN	DURING THE LAST MONTH				YESTERDAY	COMMENTS
		HOW OFTEN			HOW MUCH	HOW MUCH	
		DAY	WEEK	MONTH	# PILLS/TAB/ CAP/TSP, etc.	# PILLS/TAB/ CAP/TSP, etc.	

RECIPE FORM #1

Name of the Recipe:____________________________

Cooking Time:________________

Temperature: ________________

DESCRIPTION OF THE RECIPE AND COOKING PROCEDURES	QUANTITY

(For Health Canada to complete) TOTAL YIELD:____________________

RECIPE FORM #2

Name of Recipe:____________________________

Cooking Time: ________________

Temperature: ________________

DESCRIPTION OF THE RECIPE AND COOKING PROCEDURES	QUANTITY

(For Health Canada to complete) TOTAL YIELD:____________________

FORM C

Identifier #: ☐☐☐☐☐

PRINCE EDWARD ISLAND NUTRITION SURVEY
FOOD FREQUENCY QUESTIONNAIRE

PART I. This section deals with the frequency of consumption of specific foods during the **past month**.

FOOD	PORTION SIZE OR MODEL	FREQUENCY			COMMENTS/ CALCULATIONS
		DAY	WEEK	MONTH	
HOW OFTEN DID YOU CONSUME: 01 Broccoli	MO-M				
02 carrots or mixed Vegetables & carrots	MO-M				
03 Cabbage, Coleslaw and Sauerkraut	MO-M				
04 Cauliflower	MO-M				
05 Spinach - Cooked	MO-M				
06 Spinach - Raw	MO-M				
07 Squash (Dark Yellow)	MO-M				
08 Fish (excluding shellfish) - fried	PC-S				
08a - cooked other ways	PC-S				
09 Lobster - dipped in butter/ margarine/mayonnaise - fried	3/4 - 1lb 1/2 cup (w/o shell)				
09a - cooked other ways	3/4 - 1lb 1/2 cup (w/o shell)				

FORM C

Identifier #: ☐☐☐☐☐

FOOD	PORTION SIZE OR MODEL	FREQUENCY			COMMENTS/ CALCULATIONS
		DAY	WEEK	MONTH	
09b All other shellfish - dipped in butter/ margarine/mayonnaise - fried	10 units MO-M (w/o shell)				
09c - cooked other ways	10 units MO-M (w/o shell)				
10 Poultry - fried	PC-S				
11 - cooked other ways	PC-S				
12 Beef and Veal - steaks, roasts, stews and other cuts	PC-S				
13 - hamburgers	PC-S				
14 - other ground beef	PC-S				
15 Liver (all types)	PC-S				
16 Lamb and Mutton - roasts, chops and other cuts	PC-S				
17 Pork and Ham - roasts, chops and other cuts	PC-S				
18 - bacon	1 STRIP				
19 Hot dogs or Sausages	1 UNIT				
20 Luncheon meats	1 SLICE				
21 Pizza	1 SLICE				
22 Cheese (more than 24% b.f.)	1 SLICE 1/3 PC-S				
23 Light Cheese (10-24% b.f.)	1 SLICE 2 TBL				
24 Cottage cheese or any cheese (less than 10% b.f.)	MO-S				
25 Eggs or egg dishes	1 EGG				

FORM C

Identifier #: ☐☐☐☐☐

FOOD	PORTION SIZE OR MODEL	FREQUENCY			COMMENTS/ CALCULATIONS
		DAY	WEEK	MONTH	
26 Potatoes - french fries or pan fried	MO-L				
27 - baked, boiled or mashed (plain)	MO-L 1 medium				
28 - cooked other ways (i.e. milk/fat added)	MO-L				
29 Potato chips or tortilla chips	1 BO-L				
30 Rich gravy or pan drippings	1/4 CUP				
31 Cream or cheese sauce	1/4 CUP				
32 Yogourt (more than 1% b.f.)	1/2 CUP 175 G				
33 Light Yogourt (1% or less b.f.)	1/2 CUP 175 G				
34 Ice cream, regular or rich	1/2 CUP				
35 Low fat ice cream, frozen yogourt, ice milk or sherbet	1/2 CUP				
36 Bread, white	1 SLICE				
37 Bread, whole wheat	1 SLICE				
38 Crackers	1 CRACKER				
39 Cookies	1 COOKIE				
40 Donuts, cakes, pies, muffins or croissants	1 UNIT				
41 Beer	1 BOTTLE				
42 Wine	4 FOZ.				
43 Spirits	1 FOZ.				

FORM C

Identifier #: ☐☐☐☐☐

FOOD	PORTION SIZE OR MODEL	FREQUENCY			COMMENTS/ CALCULATIONS
		DAY	WEEK	MONTH	
IN TEA AND COFFEE, WHAT KIND OF MILK DID YOU USE? [DO NOT READ LIST] 44 whole milk	1 TBL				
45 2% milk	1 TBL				
46 1% milk	1 TBL				
47 skim milk	1 TBL				
48 dry skim milk powder	1 TSP				
49 cream or creamers	1 TBL				
50 Triple milk - **undiluted**	1 TBL				
51 Triple milk - **diluted ratio 2:1**	1 TBL				
52 Triple milk - **other dilution**________	1 TBL				
53 evaporated milk, whole - **undiluted**	1 TBL				
54 evaporated milk, 2% - **undiluted**	1 TBL				
54a evaporated milk, skim - **undiluted**	1 TBL				
55 evaporated milk, whole - **diluted**	1 TBL				
56 evaporated milk, 2% - **diluted**	1 TBL				
57 other types of milk (please specify) ______________________________					
58 did not use milk or cream (please check) _____					
59 did not drink tea or coffee (please check) _____					
60 used coffee whitener (please check) _____					

FORM C

Identifier #: ☐☐☐☐☐

FOOD	PORTION SIZE OR MODEL	FREQUENCY			COMMENTS/ CALCULATIONS
		DAY	WEEK	MONTH	
ON CEREALS WHAT KIND OF MILK DID YOU USE? [DO NOT READ LIST] 61 whole milk	1/2 CUP				
62 2% milk	1/2 CUP				
63 1% milk	1/2 CUP				
64 skim milk	1/2 CUP				
65 cream	1/2 CUP				
66 Triple milk - undiluted	1/2 CUP				
67 Triple milk - diluted ratio 2:1	1/2 CUP				
68 Triple milk - other dilution________	1/2 CUP				
69 evaporated milk, whole - undiluted	1/2 CUP				
70 evaporated milk, 2% - undiluted	1/2 CUP				
70a evaporated milk, skim - undiluted	1/2 CUP				
71 evaporated milk, whole - diluted	1/2 CUP				
72 evaporated milk, 2% - diluted	1/2 CUP				

73 other types of milk (please specify) ____

74 did not eat cereals (please check) _____

FORM C

Identifier #: ☐☐☐☐☐

FOOD	PORTION SIZE OR MODEL	FREQUENCY			COMMENTS/ CALCULATIONS
		DAY	WEEK	MONTH	
AS A BEVERAGE, WHAT KIND OF MILK DID YOU DRINK? [DO NOT READ LIST] 75 whole milk	1 CUP				
76 2% milk (white or chocolate)	1 CUP				
77 1% milk	1 CUP				
78 buttermilk	1 CUP				
79 skim milk	1 CUP				
80 Triple milk - **undiluted**	1 CUP				
81 Triple milk - **diluted ratio 2:1**	1 CUP				
82 Triple milk - **other dilution**	1 CUP				
83 evaporated milk, whole - **undiluted**	1 CUP				
84 evaporated milk, 2% - **undiluted**	1 CUP				
84a evaporated milk, skim - **undiluted**	1 CUP				
85 evaporated milk, whole - **diluted**	1 CUP				
86 evaporated milk, 2% - **diluted**	1 CUP				
87 other types of milk (please specify)					
88 did not drink milk (please check)					
HOW FREQUENTLY IN THE LAST MONTH DID YOU HAVE MEALS FROM?					
		DAY	WEEK	MONTH	
89 restaurants (table service)					
90 take out from fast food restaurants or delis					
91 cafeterias (tray service)					

FORM C

Identifier #: ☐☐☐☐☐

PART II. This section deals only with **homemade foods** and **uses of fat** over the past month. *Please check (√) the main source(s) of fat used. (If more than one source is checked, then all checks will be calculated as equal proportions).*

	MAIN SOURCE	
		IF YOU ATE **HOME DEEP-FAT-FRIED FOODS** AT LEAST TWICE THIS PAST MONTH, WHAT WAS THE MAIN KIND OF **FAT OR OIL** USED? **[DO NOT READ LIST]**
92		a) Vegetable oil
93		b) Lard, bacon/animal fat
94		c) Shortening
95		d) Do not know
96		e) Did not eat home deep-fried foods this past month
		IF YOU ATE **HOME-PAN FRIED FOODS** AT LEAST TWICE THIS PAST MONTH, WHAT WAS THE MAIN KIND OF **FAT OR OIL** USED? **[DO NOT READ LIST]**
97		a) Butter
98		b) 20/80 spread
99		c) 50/50 spread
100		d) Soft margarine
101		e) Hard margarine
102		f) Lard, bacon or animal fat
103		g) Shortening
104		h) Oil
105		i) Pam or no oil
106		j) Do not know
107		k) Did not eat home pan-fried foods this past month

FORM C

Identifier #: ☐☐☐☐☐

	MAIN SOURCE	
		IF YOU ATE **HOME-BAKED FOODS** AT LEAST TWICE THIS PAST MONTH, WHAT WAS THE MAIN KIND OF **FAT OR OIL** USED? **[DO NOT READ LIST]**
108		a) Butter
109		b) 20/80 spread
110		c) 50/50 spread
111		d) Soft margarine
112		e) Hard margarine
113		f) Shortening
114		g) Oil
115		h) Lard, bacon/animal fat
116		i) Do not know
117		j) Did not eat home-made baked goods that contained fat this past month
		WHAT WAS THE MAIN KIND OF **"FAT SPREAD"** YOU USED ON **BREAD, BUNS, MUFFINS**, ETC. THIS PAST MONTH? **[DO NOT READ LIST]**
118		a) Butter
119		b) 20/80 spread
120		c) 50/50 spread
121		d) Soft margarine
122		e) Hard margarine
123		f) Low calorie margarine
124		g) Lard, bacon or pork fat
125		h) None or none of these
126		i) Did not eat bread, buns, muffins, etc. this past month

FORM C

Identifier #: ☐☐☐☐☐

	MAIN SOURCE	
		WHAT WAS THE MAIN KIND OF "FAT SPREAD" YOU PUT ON POTATOES OR VEGETABLES THIS PAST MONTH? [DO NOT READ LIST]
127		a) Butter
128		b) 20/80 spread
129		c) 50/50 spread
130		d) Soft margarine
131		e) Hard margarine
132		f) Low calorie margarine
133		g) Sour cream
134		h) Lard, bacon fat, other
135		i) None or none of these
136		j) Did not eat potatoes and vegetables this past month

PART III. This section deals with your food habits during the past month. *Please check (✓) one or more when relevant.*

	MOST OFTEN	[If the person did not eat meat or poultry or fish in Part I, then check (✓) "Did not eat meat/poultry/fish cooked by these methods this past month" below where appropriate (instead of asking questions #137 to 178)].
		OF THE MEAT YOU ATE LAST MONTH, WHAT WAS THE MOST COMMON METHOD OF COOKING IT? [DO NOT READ LIST]
137		a) Broiled
138		b) Pan-fried with fat
139		c) Pan-fried without fat or with pan spray
140		d) Deep-fat fried
141		e) Oven-roasted (Baked)
142		f) Boiled
143		g) Microwaved
144		h) Barbecued
145		i) Steamed/Poached
146		j) Did not eat meat cooked by these methods this past month

FORM C

Identifier #: ☐☐☐☐☐

	MOST OFTEN	[If the person did not eat meat or poultry or fish in Part I, then check (✓) "Did not eat meat/poultry/fish cooked by these methods this past month" below where appropriate (instead of asking questions #137 to 178)].
		OF THE **POULTRY** YOU ATE LAST MONTH, WHAT WAS THE MOST COMMON **METHOD OF COOKING** IT? [DO NOT READ LIST]
147		a) Broiled
148		b) Pan-fried with fat
149		c) Pan-fried without fat or with pan spray
150		d) Deep-fat fried
151		e) Oven-roasted (Baked)
152		f) Boiled
153		g) Microwaved
154		h) Barbecued
155		i) Steamed/Poached
156		j) Did not eat poultry cooked by these methods this past month
		OF THE **FISH** YOU ATE LAST MONTH, WHAT WAS THE MOST COMMON **METHOD** OF COOKING IT? THIS DOES NOT INCLUDE CANNED FISH. [DO NOT READ LIST]
157		a) Broiled
158		b) Pan-fried with fat
159		c) Pan-fried without fat or with pan spray
160		d) Deep-fat fried
161		e) Oven-roasted (Baked)
162		f) Boiled
163		g) Microwaved
164		h) Barbecued
165		i) Steamed/Poached
166		j) Did not eat fish cooked by these methods this past month

FORM C

Identifier #: ☐☐☐☐☐

	MOST OFTEN	[If the person did not eat meat or poultry or fish in Part I, then check (✓) "Did not eat meat/poultry/fish cooked by these methods this past month" below where appropriate (instead of asking questions #137 to 178)].
		[If the person did not eat meat or poultry in part I, then check (✓) "Did not eat meat/poultry this past month" below where appropriate.
		OF THE MEAT YOU ATE LAST MONTH, DID YOU EAT THE **VISIBLE FAT OF THE MEAT**?
167		a) Always
168		b) Sometimes
169		c) Never
170		d) Did not eat meat this past month
		OF THE **POULTRY** YOU ATE LAST MONTH, DID YOU EAT THE **SKIN ON THE POULTRY**?
171		a) Always
172		b) Sometimes
173		c) Never
174		d) Did not eat poultry this past month
		OF THE **MEAT OR POULTRY** YOU ATE LAST MONTH, DID YOU EAT **GRAVY** WITH YOUR **MEAT OR POULTRY**?
175		a) Always
176		b) Sometimes
177		c) Never
178		d) Did not eat meat or poultry this past month
		IN THE PAST MONTH, **WHAT WAS THE MAIN KIND OF DRESSING** YOU ADDED TO YOUR SALADS? **[DO NOT READ LIST]**
179		a) mayonnaise
180		b) mayonnaise-type and regular salad dressing
181		c) low calorie and calorie reduced salad dressing
182		d) other (i.e. yogourt, vinegar only, tomato juice, etc.)
183		e) Did not add dressing
184		f) Did not eat salad this past month

FORM C

Identifier #: ☐☐☐☐☐

PART IV. This section deals with WHY you choose the foods that you eat. *(Briefly probe to confirm some action is being taken). Please check (✓) one or more when relevant.*

ARE YOU **CHOOSING OR AVOIDING** FOODS OR TYPES OF FOODS BECAUSE YOU ARE CONCERNED ABOUT:		
185		Maintaining or improving your health?
186		Heart disease?
187		Cancer?
188		Osteoporosis (brittle bones)?
189		High Blood Pressure?
190		Weight gain?
ARE YOU **CHOOSING** TO EAT FOODS OR TYPES OF FOODS BECAUSE OF:		
191		the nutrients they contain?
192		the unsaturated fat content?
193		the fibre content?
ARE YOU **AVOIDING** FOODS OR TYPES OR FOODS BECAUSE OF:		
194		the fat content?
195		the salt content?
196		the cholesterol content?
197		the sugar content?
198		the saturated fat content?

ARE YOU FOLLOWING ANY SPECIAL DIET?	
199	☐ Yes (Specify)________________________________ ☐ No (Go to # 203)

WAS THIS SPECIAL DIET PRESCRIBED BY A DOCTOR, DIETITIAN OR OTHER HEALTH PROFESSIONALS?		
200	Doctor:	☐ Yes ☐ No ☐ Refused
201	Dietitian:	☐ Yes ☐ No ☐ Refused
202	Other health professionals:	☐ Yes (Specify)____________________ ☐ No ☐ Refused

FORM C

Identifier #: ☐☐☐☐☐

[IF THE PERSON HAS A SECOND INTERVIEW ASSIGNED, THEN GO TO #1 - "NUTRITION AND HEALTH QUESTIONNAIRE" - FORM D].

203 **HAVE YOU EVER SEEN OR HEARD ABOUT THE "CANADA'S FOOD GUIDE TO HEALTHY EATING"?** (Show Food Guide)

☐ Yes

☐ No (Go to #1 - "Nutrition and Health Questionnaire" - Form D)

204 Do you use it?

☐ Yes

☐ No (Go to #1 - "Nutrition and Health Questionnaire" - Form D)

205 How do you use it? (Check one or more when relevant)

☐ for shopping e.g. to help prepare my shopping list

☐ for planning/choosing meals (at home)

☐ for choosing foods in restaurants

☐ other (specify) ______________________________

FORM D

Identifier # ☐☐☐☐☐

PEI NUTRITION SURVEY

NUTRITION AND HEALTH QUESTIONNAIRE

I would like to ask you some questions about your health.

PART I

1 In general, compared to other people your age, would you say your health is ....

Excellent	1
Very good	2
Good	3
Fair	4
Poor	5

I am going to read you a list of actions people might take to prevent heart disease or heart attacks. For each one, please tell me if you think it would have little or no effect, a moderate effect, or a large effect? **(READ LIST)**

		Little or No Effect	Moderate Effect	Large Effect	Not Sure
2	a. First, losing weight. If one is overweight, would weight reduction have little or no effect, a moderate effect, or a large effect in preventing heart disease?	1	2	3	9
3	b. How about reducing cigarette smoking? Would that have little or no effect, a moderate effect, or a large effect in preventing heart disease?	1	2	3	9
4	c. Lowering high blood pressure?	1	2	3	9
5	d. Lowering high blood cholesterol?	1	2	3	9
6	e. Eating fewer high-fat foods?	1	2	3	9
7	f. Eating fewer high cholesterol foods?	1	2	3	9

FORM D

Identifier # ☐☐☐☐☐

8 Do you exercise regularly? By that, I mean do you exercise for at least 20 minutes at least 3 times a week?

Yes.................... 1
No 2
Not sure 9

9 The next few questions are about smoking.

Have you ever smoked cigarettes?

☐ Y ☐ N (Q12)

10 At the present time do you smoke cigarettes?

☐ Y ☐ N (Q12)

11 Do you usually smoke cigarettes every day?

☐ Y ----> How many per day? ☐☐ cigarettes

☐ N

12 Do you eat less than you want in order to control your weight?

Yes 1
No/Not sure 2

13 Are you on a low-calorie or weight loss diet?

Yes 1
No/Not sure 2 (Q15)

14 Did a doctor or other health professional advise you to lose weight, or was it your own idea? **(DO NOT READ)**

Advised by doctor/
other professional 1
Own idea 2
Both 3
Not sure 4

FORM D

Identifier # ☐☐☐☐☐

Part II. In this section I am going to ask you about information on nutrition and foods.

First, I'm going to read a list of some places where people get information about diet and health--such as information about sodium, fat and fibre in the diet and the links between diet and disease. Please tell me whether you yourself get a lot, a little, or no information about diet and health from each place.

		A Lot	**A Little**	**None**	**(DO NOT READ) (Not Sure)**
15	a. Physicians and other health providers	1	2	3	9
16	b. Food advertisements	1	2	3	9
17	c. News stories and news programs	1	2	3	9
18	d. Grocery store handouts or displays	1	2	3	9
19	e. Food labels or packaging	1	2	3	9
20	f. Health organizations such as PEI Heart Health Program, Heart & Stroke Foundation, Partners for Living or the Canadian Cancer Society	1	2	3	9

FORM D

Identifier # ☐☐☐☐☐

To you personally, is it very important, somewhat important, not too important, or not at all important to **(STATEMENT)** ?

To you personally, how important is it to (NEXT STATEMENT)?

IF NEEDED, SAY: "Is that very important, somewhat important, not too important, or not at all important to you personally?"

IF NEEDED, SAY: "The question is not asking about your actual eating habits, it is asking about the importance of the statement to you personally."

	STATEMENT	Very Important	Somewhat Important	Not Too Important	Not at all Important	DON'T KNOW
21	a. Use salt or sodium only in moderation?					
22	b. Choose a diet low in saturated fat?					
23	c. Choose a diet with plenty of fruits and vegetables?					
24	d. Use sugars only in moderation?					
25	e. Choose a diet with adequate fibre?					
26	f. Eat a variety of foods?					
27	g. Maintain a healthy weight?					
28	h. Choose a diet low in fat?					
29	i. Choose a diet low in cholesterol?					
30	j. Choose a diet with plenty of breads, cereals, rice, and pasta?					
31	k. Eat at least two servings of dairy products daily?					
	STATEMENT	Very Important	Somewhat Important	Not Too Important	Not At All Important	DON'T KNOW

FORM D

Identifier # ☐☐☐☐☐

How many people, including yourself, live in this household?

32 ☐☐ (If only one person, then go to #34)

33 Of that total number, how many persons are under 18 years old and are your dependents?
☐☐

34 Which of the following statements best describes the food eaten by (you/your family)? Do you have enough food to eat, sometimes not enough to eat or often not enough to eat?	☐ enough food to eat (Q40) ☐ sometimes not enough to eat ☐ often not enough to eat
35 Thinking about the past month, how many days did (you/your family) have no food or money to buy food?	☐ none (Q40) _______ days number ☐ DK
Which of the following reasons explain why (you have/your family has) had this problem?	
36 a. because of transportation problems?	☐ Y ☐ N
37 b. because you did not have working appliances for storing or preparing foods (such as stove, refrigerator)?	☐ Y ☐ N
38 c. because you did not have enough money to buy food or beverages?	☐ Y ☐ N
39 d. Any other reason?	☐ Y ☐ N ---> _______________ specify

FORM D

Identifier # ☐☐☐☐☐

40 Thinking about the past month did (you/adult members of your family) ever cut the size of your meals because there wasn't enough money for food?	☐ Y ☐ N ☐ DK
41 During the past month did you skip any meals because there wasn't enough food or money to buy food?	☐ Y ☐ N (Q1, Form E) ☐ DK
42 How many days in the past month did you skip any meals because there wasn't enough food or money to buy food?	______ no. of days ☐ DK
43 Did you skip any meals yesterday because there wasn't enough food or money to buy food?	☐ Y ☐ N ☐ DK
44 During the past month, were there any days when you did not eat at all because there wasn't enough food or money to buy food?	☐ Y ☐ N (Q1, Form E) ☐ DK
45 In the past month, how many days were there when you didn't eat at all?	______ no. of days ☐ DK

Acknowledgements:
Briefel RR & Woteki CE (1992) Development of food sufficiency questions for the Third National Health and Nutrition Examination Survey. Journal of Nutrition Education 24:24S-28S.
FDA Health and Diet Survey (1990)
USDA Diet & Health Knowledge Survey (1994-1996)
Alberta Nutrition Survey
Canada's Health Promotion Survey, 1990.
Stunkard AJ, Coll M, Lundquist S, Meyers AW. (1980) Obesity and eating style. Archives Gen Psychiatry 37:1127-1129.

FORM E

Identifier # ☐☐☐☐☐

PEI NUTRITION SURVEY

DEMOGRAPHIC PROFILE

In order to compare your answers with people from similar backgrounds we would like to ask you a few questions about yourself.

1. What is the highest grade or level of education you have ever attended or ever completed? (Mark only one)

01 ☐ No schooling
02 ☐ Some Elementary
03 ☐ Completed Elementary
04 ☐ Some Secondary
05 ☐ Completed Secondary
06 ☐ Some Community College, Technical College, or Nurse's training
07 ☐ Completed Community College, Technical College, or Nurse's training
08 ☐ Some University (e.g. B.A. M.A. PhD) or teachers college
09 ☐ Completed University (e.g. B.A. M.A. PhD) or teachers college
10 ☐ Other education or training (Specify ________________)

2. What is your current marital status? Are you...

01 ☐ Single (Never Married)?
02 ☐ Married (and not separated), or living common law?
03 ☐ Separated?
04 ☐ Divorced?
05 ☐ Widowed?

FORM E

Identifier # ☐☐☐☐☐

3. What is your best estimate of the total income of all household members from all sources in 1994 before taxes and deductions? Was the total household income…

- Less than $20,000 01 ☐ -->
  - Less than $10,000 05 ☐ ->
    - Less than $5,000 09 ☐
    - $5,000 or more 10 ☐
  - $10,000 or more 06 ☐ ->
    - Less than $15,000 11 ☐
    - $15,000 or more 12 ☐
- $20,000 or more 02 ☐ -->
  - Less than $40,000 07 ☐ -->
    - Less than $30,000 13 ☐
    - $30,000 or more 14 ☐
  - $40,000 or more 08 ☐ -->
    - Less than $60,000 15 ☐
    - $60,000 to $79,999 16 ☐
    - $80,000 or more 17 ☐

03 ☐ No income

04 ☐ Don't know

FORM E

Identifier # ☐☐☐☐☐

4. **Weight used for calibration** ☐☐☐ . ☐ Kg

Weight on scale of calibration weight ☐☐☐ . ☐ Kg

Weight ☐☐☐ . ☐ Kg or ☐☐☐ lb.

Measured ☐

Self-reported ☐ …Reason ____________

Refusal ☐

5. **Height** ☐☐☐ . ☐ cm **or** ☐ feet ☐☐ inches

Measured ☐

Self-reported ☐ …Reason ________________________

Refusal ☐

6. **Waist** ☐☐☐ . ☐ cm ☐☐☐ . ☐ cm | ☐☐☐ . ☐ cm

Refusal ☐

7. **Hips** ☐☐☐ . ☐ cm ☐☐☐ . ☐ cm | ☐☐☐ . ☐ cm

Refusal ☐

Acknowledgements: Alberta Nutrition Survey, 1994
Canada's Health Promotion Survey, 1990.
Nova Scotia Nutrition Survey, 1990.

X

APPENDIX B
Training Schedule

Training Schedule (agenda follows) used with PEI Nutrition Survey Training Manual.

Contents of PEI Nutrition Survey Training Manual:

Chapter 1	Survey Overview
Chapter 2	Survey Personnel
Chapter 3	Interviewer Responsibilities
Chapter 4	The Survey Process
Chapter 5	Interviewing Techniques -General Guidelines
Chapter 6	Administering the 24-hour Recall
Chapter 7	Food Frequency Questionnaire
Chapter 8	Nutrition and Health Questionnaire
Chapter 9	Demographic Information
Chapter 10	Anthropometric Measurements
Chapter 11	Quality Control Procedures
Chapter 12	Data Processing and Handling

PRINCE EDWARD ISLAND NUTRITION SURVEY

Interviewer's Training Schedule

March 27 to April 07, 1995, University of PEI
Charlottetown, Prince Edward Island

WEEK I

DATE 1995	TOPIC/AGENDA	PRESENTER
Monday, March 27	Welcome and Introduction to Survey	L Sweet, J Taylor, R White, D McLellan, L Van Til
Meeting Room		
Sport Centre	Review of Training Schedule	D Brulé
Main Room	Interactive Exercise # 1	D Brulé, T Riege
	BREAK	
Breakout Rooms	Overview of Survey (CHPT 1)	R White
Hallway	Interactive Exercise # 2	D Brulé, T Riege
Boardroom		
	LUNCH	
	Roles and Responsibilities of the Project Team,	J Taylor
	Interviewers & Facilitators (CHPT 2,3)	
	Introduction to Survey Forms (CHPT 4)	D Brulé
	Presentation of the sample	L Van Til
	BREAK	
	Portion Model Kits, (CHPT 6)	D Brulé, T Riege
	Recording Food Quantities	D Brulé
	Practice Recording Quantities	D Brulé, T Riege
Tuesday, March 28	Food Description Guidelines (CHPT 6)	D Brulé
	BREAK	
Meeting Rooms	Food Description Guidelines	D Brulé
Sport Centre	Coded Columns on 24-Hour Recall	T Riege
Main Room	Practice with 24-Hour Recall	D Brulé
	Food and Eating Habits in Prince Edward Island	D McLellan
	Oaths and Photos for nametags	
Breakout Rooms		
Hallway	**LUNCH**	
Boardroom	Interviewing Techniques, (CHPT 5)	P MacKenzie-Young, Stat Can
	Phone contacts	
	BREAK	
	Practice with Phone Introduction	T Riege
	Discussion of Training to date	D Brulé

DATE 1995	TOPIC/AGENDA	PRESENTER
Wednesday,	Recording Recipes and Supplements (CHPT 6)	D Brulé, T Riege
March 29	Practice with Recipe and Nutrient Supplement Forms	
	BREAK	
Meeting Room	Field Level Quality Assurance, (CHPT 11)	J Taylor, T Riege
Sport Centre	Setup Survey Teams	
Main Room	Administrative & Control Forms (CHPT 4)	J Taylor, T Riege, L VanTil
	LUNCH	
Breakout Rooms	Practice with Administrative and Control Forms	J Taylor, T Riege, L VanTil
Hallway	Anthropometry Workshop (CHPT 10)	Certified Fitness Appraisor
Boardroom	**BREAK**	
	Practice -> Anthropometric measurements	D Brulé, J Taylor, T Riege
Thursday,	Food Frequency Questionnaire (CHPT 7)	D Brulé
March 30	**BREAK**	
	Food Frequency Questionnaire (continued)	D Brulé
Meeting Room	Practice -> Food Frequency Questionnaire	
Sport Centre		
Main Room	**LUNCH**	
	Practice with 24h recall and FFQ	D Brulé
Breakout Rooms	Exchange and recheck forms (between interviewers)	
Hallway	Team meetings	Facilitators
Boardroom	**BREAK**	
	Video - Probing without bias (24hr recall)	T Riege
Friday, March 31	Discussion of the previous day's interviews	D Brulé
	BREAK	
Meeting Room	Nutrition and Health Questionnaire (CHPT 8)	D Brulé, J Taylor
Sport Centre	Demographic Profile (CHPT 9)	
Breakout Rooms	**LUNCH**	
Hallway	Practice Interviews with the entire package	
Boardroom	**BREAK**	
	Complete/exchange/review all Forms and Questionnaires	D Brulé
	Grocery Search Guidelines and Assignments	D Brulé
	Review of training to date and assignments for the weekend	D Brulé, T Riege
Note: Please take manuals and equipment with you for the weekend.		

WEEK II

DATE	TOPIC/AGENDA	PRESENTER
Monday, April 3	Discussion of Weekend Interviews	D Brulé
	Report of Forms submitted on Friday	D Brulé
Meeting Room	Grocery Search Demonstrations	Trainees
Sport Centre	**BREAK**	
Main Room	Practice Interviews (submit forms to Facilitators)	D Brulé
	LUNCH	
Breakout Rooms	Demonstration of CANDI Operation (CHPT 12)	D Brulé
Hallway	**BREAK**	
Boardroom	CANDI Operation (continued)	D Brulé
	Quality Control Procedures, (CHPT 11) Feedback from Ottawa	D Brulé
Tuesday, April 4	Grocery Search Demonstrations	Trainees
	Practice Interviews	D Brulé
Meeting Room	**BREAK**	
Sport Centre	Practice Interviews (submit forms to Facilitators)	D Brulé
Main Room	Personal Safety	Dwight Mullally, Community Policing Coord.
	LUNCH	
Breakout Rooms	Set Menu Exercises and Evaluation	D Brulé
Hallway	Set up rooms for Volunteer Interviews	
Boardroom	Volunteer Interviews	
	Check forms and Submit package to Facilitators	D Brulé
Please Note: Take manuals and equipment with you.		
Wednesday, April 5	Discussion of previous day's interviews	D Brulé
	Report from Facilitators	Facilitators
	Team Meetings, (topic: logistics)	Facilitators
Meeting Room	**BREAK**	
Sport Centre	Set Menu exercises and Evaluation	D Brulé
Main Room	Assignments for In-Home Interviews (Today and Tomorrow)	J Taylor, D McLellan
Breakout Rooms		
Hallway	**LUNCH**	
Boardroom	In-Home Interviews	Trainees as per assignments

DATE 1995	TOPIC/AGENDA	PRESENTER
Thursday, April 6	Discussion of In-Home Interviews	D Brulé
	Report from Facilitators	Facilitators
Meeting Room	**BREAK**	
Sport Centre	Teams meet with facilitators	Facilitators
Main Room	Written Evaluation	D Brulé
Breakout Rooms	**LUNCH**	
Hallway	In-Home Interviews	Trainees as per assignments
Boardroom		
Friday, April 7	Discussion of Second In-Home Interviews	D Brulé
	Discussion on Logistics	Teams
Meeting Room	Report from Facilitators	Facilitators
Sport Centre	**BREAK**	
Main Room	Report on Evaluations	D Brulé
	Final Review/Discussion - Technical Issues	D Brulé
Breakout Rooms		
Hallway	**LUNCH**	
Boardroom	Final Review of Administrative Issues	J Taylor
	Trainees Evaluation and Recommendations for retraining	J Taylor
	Final Wrap-up	PEI Investigators

APPENDIX C
Administrative Data Control Forms

Form	Contact Sheet and Record of Calls
Form A1	Data Entry
Form	Progress Tally Sheet
Form	Data Control Form

PEI NUTRITION SURVEY - CONTACT SHEET

LABEL:
ID Number
Sex, Date of Birth, Age
First name, Last name
Address 1
Address 2, Postal Code
Phone

Interviewer ID: ☐☐

New Name: ____________________

New Address: ____________________

____

New Postal Code: ____________________

Phone Number: ____________________

Location/ Other Comments

____

____

____

Please give the name of a close relative or friend whom we can contact in case we need to reach you.

Contact Name: ____________________

Contact Address: ____________________

____

Contact Postal Code: ____________________

Contact Phone Number: ____________________

RECORD OF CALLS & APPOINTMENTS

ASSIGNED INTERVIEW DAY: ______________________________

CALL	DATE	TIME	NOTES
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Acknowledgements: Alberta Nutrition Survey, 1994
Nova Scotia Nutrition Survey, 1990
Saskatchewan Nutrition Survey, 1993

PEI NUTRITION SURVEY - DATA ENTRY

FORM A-1

Date of birth and sex correct on label

☐ Yes ☐ No

☐☐ Interviewer ID

LABEL: Reference Number

☐ ☐☐☐☐☐ ☐☐

HR Sequential No. Repeat Replicate Season

Sex, Date of Birth
Assigned Interview Day, Assigned Repeat Int Day

STATUS

1 ☐ Interview Obtained
☐ No Interview Obtained

Reason for no interview:

☐ Non Responding → reason for non response:
- 2 ☐ Refusal
- 3 ☐ Location verified, temporary no contact
- 4 ☐ Language
- 5 ☐ Other ______________________________

☐ Not Resolved → reason not resolved
- 6 ☐ Letter returned, no further info
- 7 ☐ No answer after at least 5 phone attempts
- 8 ☐ Cannot locate by phone or home visit

☐ Not Eligible → reason not eligible:
- 09 ☐ Dead
- 10 ☐ Pregnant/Nursing
- 11 ☐ Moved out-of-province
- 12 ☐ Hospitalization/extraordinary illness
- 13 ☐ Living in Institution or Reserve
- 14 ☐ Other ______________________________

Date Interview Completed (Month Day Year) ☐☐☐☐☐☐

Actual Interview Day # ☐ (1=Mon,2=Tues,...)
Actual Repeat Interview Day # ☐ (1=Mon,2=Tues,...)

SIGN OFF CONTROL CHECK (ID CODES):

INTERVIEWER ☐☐

Interviewer's Opinion of Information:
- ☐ Reliable
- ☐ Unable to recall one or more meals
- ☐ Unreliable o/reasons, specify____________

FACILITATOR ☐☐

Outcome of interview:
- ☐ Complete response
- ☐ Partial response
- ☐ Non response

TOTAL # OF PAGES IN PACKAGE ☐☐

SUPERVISOR ☐☐

PRINCE EDWARD ISLAND NUTRITION SURVEY
INTERVIEWER'S PROGRESS TALLY WORKSHEET
FIRST INTERVIEW

Interviewer # ☐☐

ID NUMBER	ATTEMPTED CONTACT*	APPOINTMENT MADE	INTERVIEW CONDUCTED	NO INTERVIEW; A-1 COMPLETE***

* Interviewer initiated contact (e.g. phone calls), but person not yet reached

*** Finished attempts to contact; on FORM A-1 you indicated non-resp/not elig/not resolv

WEEKLY PROGRESS TALLY SHEET

FACSIMILE TRANSMISSION	
To: Jennifer Taylor/Deb MacLellan PEI Nutrition Study Fax: (902)	From: Interviewer #: ☐☐
PAGES: 1	DATE: Monday, Week # ☐☐
RE: Weekly Progress (Summary of Progress Tally Worksheet)	

FIRST INTERVIEWS ONLY

	# PERSONS NOT YET CONTACTED*	# PERSONS WITH ATTEMPTED CONTACT**	# PERSONS WITH APPOINTMENT MADE	# PERSONS WITH FIRST INTERVIEW CONDUCTED	# PERSONS WITH NO INTERVIEW; A-1 COMPLETE***
TOTAL TO DATE					

* Interviewer has not initiated first contact attempt

** Interviewer initiated contact (e.g. phone calls), but person not yet reached

*** Finished attempts to contact; on FORM A-1 you indicated non-resp/not elig/not resolv

PRINCE EDWARD ISLAND NUTRITION SURVEY

DATA CONTROL FORM

INTERVIEWER ☐☐						FACILITATOR ☐☐				SUPERVISOR ☐☐				
Idenfr. #	Date Interviewed	Date Forms Reviewed	PC	Date Forms to Facili-tator	Comments	Date Forms Received	Date Forms Reviewed	Date Forms to Super-visor	Comments	Date Form Received	Date Forms Reviewed	Date Forms Finalized	Date Forms to BNS	Comments

Acknowledgements: Nova Scotia Nutrition Survey, 1990
Saskatchewan Nutrition Survey, 1993
Alberta Nutrition Survey, 1994

APPENDIX D
Tracking Database

Status of the entire sample is tracked based on the information provided on the A1 form, and the information provided by the sample frame. The tracking was facilitated using the database NUTR.DBF
The structure of the database is described at the end of this appendix. The database is populated with all five replicates of the drawn sample.

Labels are printed from the database for the contact sheets (CONTACT.LBL), the A1 form for data entry (A1.LBL), and the envelopes for mailing the letter of invitation (MAIL.LBL).

Data entry used one screen for first interviews (INTERV1.SCR), and another data entry screen for repeat interviews (REPINT.SCR).

- Data entry of Interviewer ID's
  Interviewer ID's are required in the database BEFORE the A-1's are returned. They should be entered as soon as they are assigned. This is the only way of knowing where the MISSING A-1's are.

- ASSIGNED INTERVIEWER ID's
  Replicate 1 and 2 were immediately assigned an interviewer. Rep 3 and now Rep 4 need to have the assigned interviewer entered. This is done by :
  1) displaying the data using the INTERV1 form
  2) locating the correct subject ID
  3) entering the code beside INTERVIEWER ID:

- SWITCHES
  After the interviewer was assigned, there are often switches, especially with REP 1 and 2. These all need to be entered as well, or I will be accusing the wrong interviewer of not handing in all her A-1's. This is done by:
  1) displaying the data using the INTERV1 form
  2) locating the correct subject ID
  3) changing the code beside INTERVIEWER ID:
     to show the interviewer switched TO,
  4) entering the interviewer switched FROM beside [PREVIOUS:].

- ENTRY OF PRELIMINARY A-1's
  These are used to calculate our progress reports! The most important fields to enter are the STATUS code, and making sure the interviewer ID is correct.
  This may require changing the code beside INTERVIEWER ID:
  1) first change the code beside [PREVIOUS:] to the code beside
     INTERVIEWER ID:
  2) change the code beside INTERVIEWER ID: to match the A-1

- ENTRY OF CHECKED A-1's
  This is the final check before sending all forms to Ottawa. This takes place at the Department of Health (away from UPEI) as a quality control measure.

To monitor progress, and provide feedback to the facilitators and interviewers, a report was generated using SUMMARY.PRG to generate the report SUMMARY.FRM
(This program requires an interim database SUMMARY.DBF)

Structure for database: PEINUTR.DBF (3,467 records)

Field	Field Name	Type	
1	ID	4N	4 digit unique identifier
2	INT1	2N	ID of most recent interviewer assigned to the first interview
3	INT2	2N	ID of previous interviewer
4	LET	1N	Letter returned: 1= address unknown 2= address incomplete
5	STATUS	2N	code 1-14 on **FORM A-1** 1 Interview Obtained reason for non response: 2 Refusal 3 Location verified, temporary no contact 4 Language 5 Other reason not resolved: 6 Letter returned, no further info 7 No answer after at least 5 phone attempts 8 Cannot locate by phone or home visit reason not eligible: 9 Dead 10 Pregnant/Nursing 11 Moved out-of-province 12 Hospitalization/extraordinary illness 13 Living in Institution or Reserve 14 Other
6	LNAME	15C	Last name
7	GNAME	18C	Given names
8	SEX	1C	M=male, F=female
9	DOB	D	Date of Birth: MM/DD/YY
10	AGE	3N	age as of March 29, 1995
11	ADD1	21C	address
12	ADD2	21C	address
13	PC	7C	postal code
14	HR	1N	Health Region (1-5)
15	PHONE	10N	home phone number
16	STRAT	2N	age/sex stratum of sample design(1-12)
17	REP	1N	replicate (1-5)
18	INTD	1N	assigned interview day (1= Mon, 2=Tues... 7=Sun)
19	AINTD	1N	actual interview day (1= Mon, 2=Tues... 7=Sun)
20	IDATE	D	date of 1st interview: MM/DD/YY
21	RELY	1N	1=reliable, 2=unable to recall 3=unreliable other
22	PAGE	2N	# pages in 1st interview pkg
23	BATCH_1	2N	Batch # of 1st int's sent to Ottawa
24	RPT	1N	1= 1st interv only, 2=repeat int
25	RINTD	1N	assigned repeat interview day (1= Mon... 7=Sun)
26	RINT	2N	interviewer ID for repeat int
27	RSTATUS	2N	repeat interview status code 1-14 on **FORM A-1**
28	ARINTD	1N	actual repeat interview day (1= Mon... 7=Sun)
29	RDATE	D	date of repeat int: MM/DD/YY
30	RPAGE	2N	# pages in repeat interview pkg
31	BATCH_R	2N	Batch # of repeat int's sent to Ott
32	SEASON	1N	1=Spring, 2=Fall
33	ADD_CHANGE	1N	1= new address

APPENDIX E
Recommendations for Interpretation

extract from
Report of the Data Interpretation Committee
March 28, 2002

Members of PEI Nutrition Survey Data Interpretation Committee (Chaired by Dr. Tarasuk):

Dr. Valerie Tarasuk
Associate Professor, Department of Nutritional Science
Faculty of Medicine
University of Toronto

Dr. Susan Whiting
Associate Professor, Division of Nutrition and Dietetics
College of Pharmacy and Nutrition
University of Saskatchewan

Krista Esslinger
Office of Nutrition Policy and Promotion
Health Canada

Dr. Walid Adloori
Medical Director - Nutritionals
Whitehall-Robins Inc.

General Recommendations for the Interpretation of Provincial Nutrition Survey Results

From our review of the draft report of the PEI Nutrition Survey, we have identified some general recommendations for data interpretation that may be of assistance to investigators in other provinces as they prepare their final reports.

Assessment of Nutrient Adequacy

The analysis of nutrient adequacy should follow the guidelines presented in *Dietary Reference Intakes: Applications in Dietary Assessment* (Institute of Medicine, 2000).

- For nutrients for which nutrient requirement distributions have been specified, the prevalence of inadequacy is estimated by the proportion of usual intakes below the EAR or, in the case of iron, by application of the full probability approach. Unless vitamin A intake is estimated in the same units as the Dietary Reference Intakes for this nutrient, intake values should not be compared to the EAR.
- For nutrients for which only an Adequate Intake is available, the distribution of usual intakes should be presented and the group mean intake compared to the Adequate Intake.

Use of Adjusted vs Unadjusted Intake Data

It is our understanding that investigators are provided with two sets of intake data: i) the raw data and ii) data that have been adjusted to 'remove' intra-subject variation. The adjusted data provide an estimate of the distribution of usual intakes for each age-sex subgroup and are used to estimate the prevalence of inadequacy in each group. However, unadjusted data should be used for all other purposes. Adjusted data are not appropriate for use in comparisons of intake levels between subgroups defined by variables such as education, income, BMI, food security status, etc.

Vitamin D

It is regrettable that our food composition data are currently insufficient to assess the adequacy of vitamin D intakes. Given the importance of this nutrient, the committee strongly urges Health Canada to develop a more complete data base.

Anthropometric Data

It is recommended that BMIs and waist hip ratios be interpreted in relation to the standards being currently developed by Health Canada.

Suggested Process for Future Reviews

We suggest that in the future, the public release of findings from these surveys occur at the time of the release of the final report. The review of the draft report by a Data Interpretation Committee should be conducted prior to this, and we suggest that it not be a public meeting. Separating the review of the draft report from the public release of findings is advisable for two reasons: i) it ensures that the findings being released to the public are indeed the final results, and that they have undergone peer review; and ii) it lessens the time required for the review of draft reports by streamlining these meetings to focus only on material upon which the Data Interpretation Committee can constructively comment (i.e., response rates (in Methodology), Results, and Discussion/ Conclusions).

APPENDIX F

Non-Response Tables and Forms

Figure F.1 Flow of Response Categories

Table F.1 PEI Accountability Table by Age-sex Group
Table F.2 PEI Response Rates: Lower Bound on Analysis by Age-sex Group
Table F.3 PEI Response Rates: Upper Bound on Analysis by Age-sex Group
Table F.4 Characteristics of Responders and Refusers

Form A2 Non Response Questionnaire

Figure F.1 Flow of Response Categories

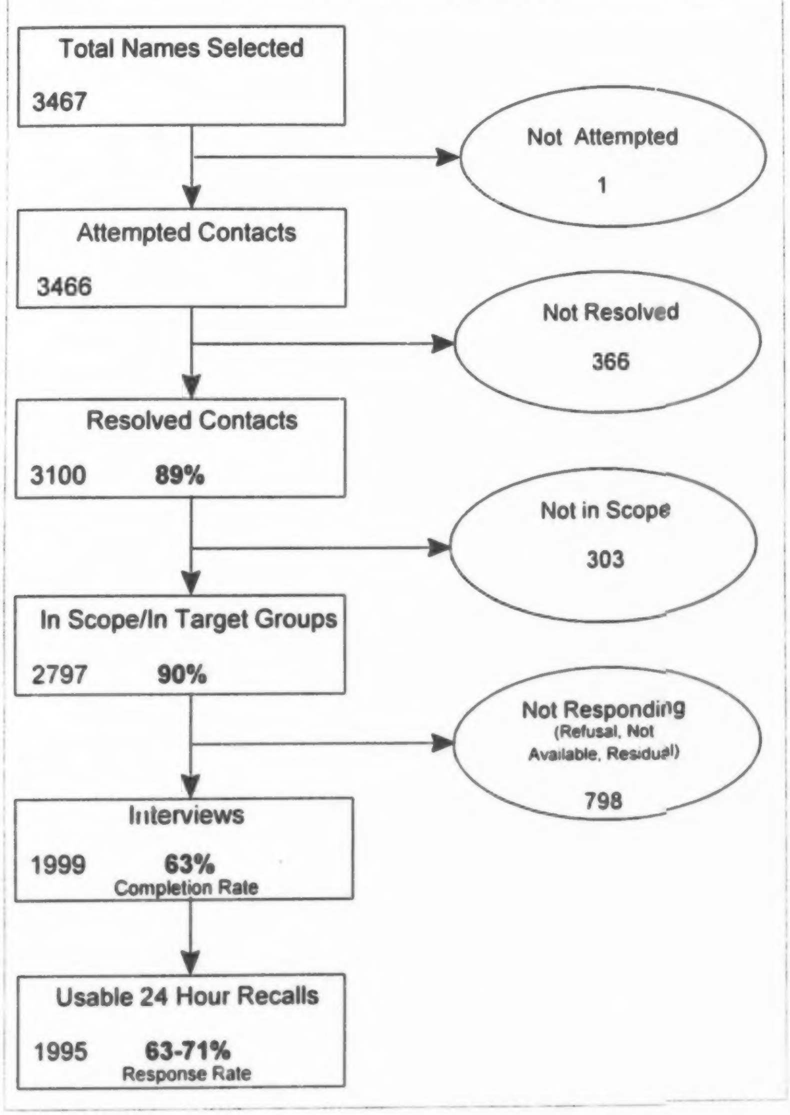
Total Names Selected
3467
Not Attempted
1
Attempted Contacts
3466
Not Resolved
366
Resolved Contacts
3100 89%
Not in Scope
303
In Scope/In Target Groups
2797 90%
Not Responding
(Refusal, Not Available, Residual)
798
Interviews
1999 63%
Completion Rate
Usable 24 Hour Recalls
1995 63-71%
Response Rate

Table F.1 PEI Accountability Table by Age-sex Group

		Sample Age-Sex Group												
		M 18 29	M 30 39	M 40 49	M 50 59	M 60 69	M 70 74	F 18 29	F 30 39	F 40 49	F 50 59	f 60 69	F 70 74	Total
Number Drawn	SUM	397	326	320	316	281	169	342	295	263	274	324	160	3467
Drawn2	SUM	397	326	320	316	281	169	342	295	263	274	324	160	3467
Attempted	SUM	397	326	319	316	281	169	342	295	263	274	324	160	3466
Resolved	SUM	347	289	290	288	255	160	288	258	232	258	292	143	3100
In Scope	SUM	273	264	279	272	243	137	225	234	228	247	264	131	2797
Interviewed	SUM	178	185	174	188	179	98	175	184	179	184	187	88	1999
Usable Recall	SUM	178	185	173	188	178	98	173	184	179	184	187	88	1995
Repeat	SUM	44	56	49	60	49	26	47	56	45	57	62	24	575

Source: BBCA 451311-007NR

Table F.2 PEI Response Rates: Lower Bound on Analysis by Age-sex Group

	SEASON					
	Season 1		Season 2		Both Seasons	
Sampling Age-Sex Groups	Response Rate	N	Response Rate	N	Response Rate	N
M 18-29	0.51	144	0.58	179	0.55	323
M 30-39	0.55	156	0.68	145	0.61	301
M 40-49	0.56	159	0.56	149	0.56	308
M 50-59	0.58	156	0.67	144	0.63	300
M 60-69	0.64	159	0.69	110	0.66	269
M 70-74	0.57	79	0.79	67	0.67	146
F 18-29	0.63	139	0.61	140	0.62	279
F 30-39	0.63	152	0.74	119	0.68	271
F 40-49	0.67	165	0.73	94	0.69	259
F 50-59	0.65	161	0.77	102	0.70	263
F 60-69	0.57	150	0.70	146	0.63	296
F 70-74	0.59	82	0.61	66	0.59	148
Total	0.60	1702	0.67	1461	0.63	3163

Source: BBCA 451311-007NR

Table F.3 PEI Response Rates: Upper Bound on Analysis by Age-sex Group

	SEASON					
	Season 1		Season 2		Both Seasons	
	Response Rate	N	Response Rate	N	Response Rate	N
Sampling Age-Sex Groups						
M 18-29	0.62	119	0.68	154	0.65	273
M 30-39	0.65	132	0.75	132	0.70	264
M 40-49	0.62	143	0.62	136	0.62	279
M 50-59	0.64	143	0.75	129	0.69	272
M 60-69	0.72	142	0.75	101	0.73	243
M 70-74	0.61	74	0.84	63	0.72	137
F 18-29	0.81	108	0.74	117	0.77	225
F 30-39	0.74	130	0.85	104	0.79	234
F 40-49	0.77	143	0.81	85	0.79	228
F 50-59	0.68	154	0.85	93	0.74	247
f 60-69	0.69	124	0.73	140	0.71	264
F 70-74	0.67	72	0.68	59	0.67	131
Total	0.69	1484	0.74	1313	0.71	2797

Source: BBCA 451311-007NR

Table F.4 Characteristics of Responders and Refusers[1]

	Responders		Refusers[1]	
	N	%	N	%
Daily Smokers				
Males	295	30 %	96	36 %
Females	209	21 %	57	26 %
Bread Consumption				
White	1190	60 %	307	61 %
Whole wheat	649	33 %	161	32 %
Milk Consumption				
2% milk	907	47 %	230	49 %
Whole milk	296	15 %	115	25 %
1% milk	245	13 %	36	8 %
Use of Vitamin-Mineral Supplements				
Males	208	21 %	39	15 %
Females	305	31 %	58	26 %

Source: BBCA 451311-007NR

[1] Non-respondents to the PEI Nutrition Survey, and completed non-response questions

F3

NON-RESPONSE QUESTIONS

FORM A-2

☐☐☐☐☐☐ ☐☐ ☐☐
Reference Number

Non-response questions completed ☐ Yes ☐ No

If you face a refusal: At the first phone contact, if an eligible person refuses to participate, tell the person that you have a few short questions to ask. Remind them that these questions refer to them personally, not the household.

If the person accepts: These questions are asked of the respondent after the administration of the 24 hr recall.

1. During the past month, did you eat bread?

☐ Yes ☐ No

If yes, what type of bread did you usually eat? (Check only one)

☐ Whole wheat (100%,80%,60%)
☐ Multigrain/Cracked Wheat
☐ Do Not Know
☐ White bread
☐ Rye, pumpernickel
☐ Other_______________

2. During the past month, did you use milk?

☐ Yes ☐ No

If yes, what type of milk did you usually use? (Check only one)

☐ Whole milk
☐ 2% milk
☐ 1% milk
☐ Skim milk
☐ Powdered Skim milk
☐ Triple milk
☐ Evaporated milk
☐ Other _______________
☐ Do not know

3. During the past month, did you use any vitamin-mineral supplement?

☐ Yes ☐ No

4. Have you ever smoked cigarettes?

☐ Yes ☐ No → END. ☐ Refused to answer → END.
↓

At the present time do you smoke cigartettes?

☐ Yes ☐ No → END. ☐ Refused to answer → END.
↓

Do you usually smoke cigarettes every day?

☐ Yes ☐ No → END. ☐ Refused to answer → END.
↓

How many cigarettes do you smoke a day?

☐☐☐ Number ☐ Refused to answer

APPENDIX G
Nutrient Intake Confidence Intervals

Table G.1 **Nutrient Intake,** by Sex: Means and 95% Confidence Intervals
Table G.2 Nutrient Intake, Males: Medians and 95% Confidence Intervals
Table G.3 Nutrient Intake, Females: Medians and 95% Confidence Intervals

Table G.4 **Nutrient Density**, Males: Means and 95% Confidence Intervals
Table G.5 Nutrient Density, Females: Means and 95% Confidence Intervals

Table G.6 **Micronutrient Inadequacy**, Males: % individuals and 95% CI
Table G.7 Micronutrient Inadequacy, Females: % individuals and 95% CI

Table G.8 **Mean Nutrient Intake** by Health Region
Table G.9 Mean Nutrient Intake by Education
Table G.10 Mean Nutrient Intake by Income Adequacy

Table G.1 Nutrient Intake[1] by Sex: Means and 95% Confidence Intervals

	Males			Females		
n	1000			995		
Nutrient	Mean	Lower CI	Upper CI	Mean	Lower CI	Upper CI
Energy	2574	2505	2643	1667	1624	1710
Protein	105	102	108	66.3	64.4	68.3
Carbohydrate	306	297	315	213	207	218
Total fat	99.3	96.1	102.6	61.8	59.6	63.9
SFA	36.1	34.9	37.5	22.2	21.3	23.0
PFA	15.0	14.4	15.6	9.9	9.5	10.3
MUFA	40.3	38.9	41.8	24.6	23.7	25.5
Cholesterol	368	351	385	212	202	223
Fibre	16.5	15.9	17.1	12.6	12.2	13.0
Sodium	3463	3344	3582	2366	2285	2446
Potassium	3501	3396	3606	2416	2347	2486
Calcium	942	902	982	647	621	674
Phosphorus	1570	1521	1619	1037	1007	1067
Magnesium	328	319	337	230	223	237
Iron	16.5	16.0	17.1	11.0	10.7	11.3
Zinc	14.0	13.3	14.7	8.6	8.3	8.9
Vitamin A	1317	1202	1432	994	918	1069
Thiamin	1.80	1.74	1.87	1.20	1.16	1.25
Riboflavin	2.16	2.09	2.24	1.38	1.34	1.42
Niacin	45.3	43.8	46.8	29.1	28.2	30.0
Vitamin B_6	2.05	1.98	2.12	1.37	1.32	1.42
Vitamin B_{12}	9.34	7.71	10.97	4.45	3.89	5.01
Pantothenic acid	5.77	5.57	5.97	3.76	3.65	3.89
Folacin	234	225	243	170	165	176
Vitamin C	99.5	92.3	106.6	77.1	72.3	81.9
Caffeine	244	222	266	208	184	232
Alcohol	7.02	5.55	8.49	1.75	1.25	2.25

[1] Intakes based on single day recalls from food sources only

Table G.2 Nutrient Intake[1], Males: Medians and 95% Confidence Intervals

	18-34			35-49			50-64			65-74		
n	275			261			282			182		
Nutrient	Median	Lower CI	Upper CI	Median	Lower CI	Upper CI	Median	Lower CI	Upper CI	Median	Lower CI	Upper CI
Energy	2683	2596	2780	2397	2317	2453	2240	2126	2304	2092	1957	2185
Protein	105	100	110	92	89	95	90	88	93	81	78	85
Carbohydrate	318	306	331	273	264	284	261	254	272	261	254	270
Total fat	102	100	105	94	89	97	84	80	86	75	71	80
SFA	36	35	38	31	30	33	29	27	31	26	24	28
PFA	14.0	13.0	15.0	13.0	13.0	14.0	12.0	12.0	13.0	11.0	11.0	12.0
MUFA	41	40	43	37	35	39	34	32	35	29	27	33
Cholesterol	307	293	323	301	285	320	286	274	304	269	255	289
Fibre	15.0	14.0	15.0	15.0	14.0	15.0	15.0	14.0	16.0	16.0	15.0	18.0
Sodium	3415	3319	3502	3062	2975	3216	2850	2750	2991	2650	2538	2734
Potassium	3530	3386	3651	3205	3061	3340	3184	3056	3295	3119	2991	3298
Calcium	969	924	1047	771	725	809	706	675	754	691	629	753
Phosphorus	1599	1522	1654	1415	1381	1459	1345	1299	1394	1285	1246	1336
Magnesium	333	321	346	295	284	307	290	279	302	296	276	307
Iron	16.0	15.0	16.0	14.0	14.0	15.0	14.0	14.0	15.0	14.0	13.0	15.0
Zinc	13.0	12.0	14.0	12.0	11.0	12.0	11.0	11.0	12.0	10.0	9.5	10.0
Vitamin A	824	795	861	823	785	878	859	809	917	1001	927	1100
Thiamin	1.7	1.6	1.7	1.6	1.5	1.6	1.6	1.5	1.7	1.5	1.5	1.6
Riboflavin	2.2	2.1	2.2	1.9	1.9	2.0	1.8	1.7	1.9	1.7	1.7	1.8
Niacin	45	43	47	41	40	42	39	39	40	35	34	37
Vitamin B_6	2.0	1.9	2.1	1.8	1.7	1.9	1.9	1.8	1.9	1.8	1.7	2.0
Vitamin B_{12}	5.6	5.1	6.0	4.3	4.1	4.6	4.3	4.0	4.5	3.9	3.7	4.4
Pantothenic acid	5.6	5.4	5.9	5.0	4.9	5.3	5.1	4.9	5.3	5.3	5.0	5.6
Folacin	216	202	227	197	189	210	206	198	215	221	206	234
Vitamin C	75	66	84	66	61	72	68	63	74	78	67	88

---

[1] Intakes from food sources only, adjusted for intra-subject variability

Source: BBCA E451311-007BV2

Table G.3 Nutrient Intake[1], Females: Medians and 95% Confidence Intervals

	18-34			35-49			50-64			65-74		
n:	258			278			292			167		
Nutrient	**Mean**	**Lower CI**	**Upper CI**	**Mean**	**Lower CI**	**Upper CI**	**Mean**	**Lower CI**	**Upper CI**	**Mean**	**Lower CI**	**Upper CI**
Energy	1710	1628	1755	1554	1497	1625	1514	1465	1605	1449	1404	1516
Protein	65	63	69	62	59	64	61	60	64	56	53	58
Carbohydrate	216	208	224	197	188	202	200	190	208	189	182	201
Total Fat	61	59	64	59	54	61	54	50	56	48	47	51
Saturated Fat	22	21	23	19	18	21	18	17	19	16	15	17
Polyunsaturated Fat	8.8	8.5	9.2	8.7	8.2	9.1	8.4	7.9	8.8	7.7	7.2	8.2
Monounsaturated Fat	24	23	25	23	22	24	21	20	23	19	18	20
Cholesterol	178	170	189	166	160	176	170	162	182	159	152	168
Fibre	10.0	9.9	11.0	11.0	10.0	12.0	13.0	12.0	13.0	13.0	12.0	13.0
Sodium	2297	2177	2383	2086	2017	2179	2104	2011	2180	1880	1785	1434
Potassium	2219	2080	2344	2305	2211	2379	2372	2306	2450	2228	2112	2398
Calcium	621	565	667	581	539	612	530	493	563	496	457	547
Phosphorus	993	944	1067	964	930	1000	963	911	1009	914	889	964
Magnesium	209	202	217	214	204	225	228	217	239	209	199	224
Iron	10.0	9.5	10.0	10.0	9.8	11.0	11.0	10.0	11.0	11.0	10.0	11.0
Zinc	7.9	7.6	8.3	7.9	7.6	8.0	7.7	7.5	7.9	7.0	6.7	7.3
Vitamin A	540	489	593	570	535	612	691	658	746	822	761	891
Thiamin	1.0	1.0	1.1	1.1	1.0	1.1	1.2	1.1	1.2	1.1	1.0	1.2
Riboflavin	1.3	1.2	1.4	1.3	1.2	1.3	1.3	1.3	1.3	1.2	1.2	1.3
Niacin	29	27	30	27	26	28	27	26	28	25	24	26
Vitamin B_6	1.2	1.2	1.3	1.3	1.2	1.3	1.3	1.3	1.4	1.2	1.2	1.3
Vitamin B_{12}	2.8	2.7	2.9	2.7	2.6	2.8	2.7	2.6	2.8	2.7	2.6	2.9
Pantothenic Acid	3.6	3.4	3.8	3.4	3.3	3.6	3.6	3.3	3.8	3.5	3.4	3.7
Folacin	133	128	142	157	150	167	166	159	175	168	157	180
Vitamin C	48	44	57	51	45	57	63	56	67	67	57	74

[1] Intakes from food sources only, adjusted for intra-subject variability

Source: BBCA E451311-007BV2

Table G.4 **Nutrient Density[1], Males: Means and 95% Confidence Intervals**

	18-34			35-49			50-64			65-74		
n	275			261			282			182		
Nutrient	**Mean**	**Lower CI**	**Upper CI**	**Mean**	**Lower CI**	**Upper CI**	**Mean**	**Lower CI**	**Upper CI**	**Mean**	**Lower CI**	**Upper CI**
Protein	41.8	40.2	43.4	40.2	38.7	41.8	43.1	41.7	44.5	40.9	39.2	42.7
Carbohydrate	118.6	115.7	121.5	118.1	115.0	121.3	120.0	117.2	122.8	128.6	124.9	132.2
Total fat	37.9	36.9	38.9	39.2	38.0	40.3	38.0	37.0	39.1	36.4	35.0	37.8
SFA	14.0	13.5	14.5	14.1	13.5	14.6	13.7	13.2	14.3	12.8	12.1	13.5
PFA	5.58	5.29	5.87	6.10	5.78	6.41	5.95	5.64	6.27	5.90	5.50	6.31
MUFA	15.3	14.8	15.8	16.0	15.4	16.6	15.3	14.7	15.8	14.5	13.8	15.2
Cholesterol	134.5	126.0	142.9	151.2	139.4	163.0	153.6	143.0	164.3	161.4	145.2	177.5
Fibre	5.95	5.54	6.35	6.61	6.21	7.00	7.47	7.00	7.93	8.89	8.22	9.56
Sodium	1393	1327	1459	1365	1304	1427	1398	1334	1462	1353	1283	1422
Potassium	1367	1311	1422	1382	1329	1434	1474	1419	1530	1558	1486	1630
Calcium	411.2	384.9	437.5	341.1	320.8	361.5	348.0	327.6	368.3	367.3	343.8	390.8
Phosphorus	635.1	611.3	658.8	595.0	575.2	614.8	630.2	609.9	650.5	651.3	624.2	678.4
Magnesium	126	122	130	130	125	135	138	133	144	148	140	155
Iron	6.50	5.88	7.12	6.52	6.13	6.90	6.92	6.61	7.23	7.39	6.92	7.85
Zinc	5.38	5.12	5.63	5.57	5.03	6.11	5.62	5.35	5.88	5.29	4.97	5.61
Vitamin A	424.4	380.2	468.7	523.0	427.3	618.7	686.7	542.2	831.2	895.3	625.3	1165.2
Thiamin	0.68	0.65	0.72	0.71	0.67	0.75	0.77	0.73	0.81	0.81	0.77	0.86
Riboflavin	0.88	0.84	0.92	0.82	0.78	0.85	0.86	0.82	0.91	0.92	0.84	1.01
Niacin	17.8	17.2	18.4	17.7	17.0	18.4	18.9	18.2	19.5	17.7	16.9	18.5
Vitamin B_6	0.78	0.74	0.81	0.80	0.76	0.84	0.88	0.83	0.92	0.94	0.88	0.99
Vitamin B_{12}	4.35	2.06	6.63	3.77	2.45	5.09	3.80	2.66	4.94	4.89	2.94	6.83
Pantothenic acid	2.23	2.13	2.32	2.19	2.08	2.30	2.44	2.30	2.59	2.80	2.54	3.05
Folacin	86.3	82.0	90.7	91.5	86.8	96.2	103.7	98.0	109.5	116.2	107.3	125.2
Vitamin C	39.8	35.2	44.4	37.7	32.7	42.6	40.6	36.5	44.7	47.2	41.2	53.2
Caffeine	79	59	98	145	120	170	118	104	132	84	74	94
Alcohol	3.04	2.05	4.02	2.78	1.96	3.60	1.71	1.09	2.33	1.11	0.53	1.70

[1] Mean intake per 1,000 kcal; intakes based on single day recalls from food sources only

Table G.5 Nutrient Density[1], Females: Means and 95% Confidence Intervals

	18-34			35-49			50-64			65-74		
n	258			278			292			167		
Nutrient	**Mean**	**Lower CI**	**Upper CI**	**Mean**	**Lower CI**	**Upper CI**	**Mean**	**Lower CI**	**Upper CI**	**Mean**	**Lower CI**	**Upper CI**
protein	40.2	38.5	41.8	41.0	39.5	42.5	41.6	40.2	43.0	40.3	38.6	42.1
carbohydrate	127.8	124.9	130.6	125.8	122.8	128.9	131.7	128.7	134.6	135.1	131.5	138.8
total fat	36.8	35.7	38.0	37.1	35.9	38.3	34.6	33.5	35.7	34.4	33.0	35.8
saturated fat	13.4	12.8	14.0	13.1	12.5	13.7	12.0	11.5	12.5	12.0	11.3	12.7
polyunsaturated fat	5.7	5.4	6.0	6.0	5.7	6.4	6.0	5.6	6.3	6.0	5.5	6.5
monounsaturated fat	14.7	14.1	15.2	14.9	14.3	15.4	13.8	13.2	14.4	13.5	12.9	14.1
cholesterol	120.3	111.9	128.7	133.0	120.6	145.5	133.0	122.9	143.0	137.2	123.8	150.7
fibre	6.6	6.2	7.0	8.0	7.5	8.5	9.0	8.4	9.5	9.6	8.9	10.3
sodium	1443	1381	1505	1456	1385	1528	1505	1420	1589	1362	1290	1434
potassium	1387	1328	1447	1555	1482	1627	1614	1551	1676	1646	1566	1726
calcium	401	375	427	403	379	427	384	362	406	383	354	412
phosphorus	614	592	636	643	621	666	658	634	683	665	633	698
magnesium	130	125	135	148	141	155	155	149	162	155	147	163
iron	6.05	5.83	6.27	7.00	6.67	7.33	7.42	7.14	7.69	7.83	7.31	8.35
zinc	5.11	4.83	5.40	5.40	5.15	5.64	5.50	5.23	5.78	5.42	5.01	5.83
vitamin A	573.7	482.8	664.5	535.1	473.7	596.6	728.6	644.5	812.8	994.4	797.6	1191.3
thiamin	0.69	0.65	0.72	0.75	0.71	0.80	0.81	0.77	0.85	0.83	0.77	0.88
riboflavin	0.81	0.77	0.84	0.86	0.82	0.89	0.88	0.84	0.91	0.91	0.87	0.96
niacin	17.8	16.9	18.6	18.0	17.2	18.8	18.5	17.8	19.2	17.8	17.0	18.7
vitamin B_6	0.80	0.76	0.85	0.86	0.81	0.90	0.91	0.87	0.96	0.92	0.86	0.98
vitamin B_{12}	2.19	1.81	2.57	2.83	2.06	3.60	2.68	2.20	3.17	5.03	3.15	6.91
pantothenic acid	2.19	2.09	2.28	2.30	2.20	2.40	2.48	2.38	2.58	2.70	2.53	2.87
folacin	88.5	83.9	93.0	113.8	107.0	120.7	118.2	112.1	124.3	127.5	118.9	136.0
vitamin C	45.1	39.8	50.5	48.4	41.9	54.9	51.5	46.5	56.4	55.3	49.0	61.7
caffeine	79	59	98	145	120	170	118	104	132	84	74	94
alcohol	0.78	0.30	1.24	1.37	0.83	1.92	1.00	0.53	1.48	0.34	0.00	0.81

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[1] Mean intake per 1,000 kcal; intakes based on single day recalls from food sources only

Table G.6 Micronutrient Inadequacy, Males: % individuals[1] and 95% Confidence Intervals

		19-30			31-50			51-70			71-74		
	EAR	%	(n)	95% CI	%	(n)	95% CI	%	(n)	95% CI	%	(n)	95% CI
phosphorus (mg)	580	0		0	0		0	0		0	0		0
magnesium (mg)	330 if 19-30 350 if 31-74	47	(95)	40-55	68	(240)	63-73	76	(282)	71-80	78	(61)	69-87
zinc (mg)	9.4	13	(26)	9-18	15	(52)	11-19	24	(94)	20-28	39	(31)	28-50
iron (mg)	19-50 51-74				0.14		0.07-0.22				0.53		0.34-0.71
vitamin A (µg)	625	16	(32)	11-21	19	(68)	15-23	19	(71)	15-24	10	(8)	3-16
thiamin (mg)	1	3	(5)	0.4-6	8	(29)	5-11	10	(38)	7-13	6	(5)	0.9-12
riboflavin (mg)	0	0		0	1	(4)	.03-2	3	(11)	1-5	9	(7)	2-15
niacin (mg)	12	0		0	0		0	0		0	0		0
vitamin B6 (mg)	1.1 if 19-50 1.4 if 50+	5	(10)	2-8	6	(20)	3-8	19	(72)	15-23	21	(17)	12-30
vitamin B12 (µg)	2	3	(7)	0.9-6	5	(18)	3-7	5	(19)	3-7	5	(4)	0.2-9
folate (µg)	320	90	(158)	85-94	94	(333)	92-97	92	(343)	89-95	89	(70)	82-96
vitamin C (mg)	75	48	(95)	40-55	60	(215)	55-65	55	(206)	50-60	41	(33)	30-52

Source: BBCA E451311-007BV2

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[1] adjusted for intra-subject variability; based on food sources only

Table G.7 Micronutrient Inadequacy, Females: % individuals[1] and 95% Confidence Intervals

		19-30			31-50			51-70			71-74		
	EAR	%	(n)	95% CI	%	(n)	95% CI	%	(n)	95% CI	%	(n)	95% CI
phosphorus (mg)	580	4	(7)	1-7	7	(26)	5-10	5	(20)	3-8	4	(3)	0-9
magnesium (mg)	255 if 19-30 265 if 31-74	77	(141)	71-83	79	(302)	75-83	73	(264)	69-78	81	(59)	72-90
zinc (mg)	6.8	31	(56)	24-37	25	(91)	20-29	29	(108)	24-33	51	(37)	40-63
iron (mg)	19-50				29		28-31						
	51-74										2.3		1.6-2.8
vitamin A (µg)	500	49	(89)	41-56	37	(141)	32-42	16	(54)	12-19	8	(6)	2-15
thiamin (mg)	0.9	30	(56)	24-37	33	(123)	28-37	25	(90)	20-30	24	(17)	14-34
riboflavin (mg)	0.9	14	(26)	9-19	14	(50)	10-17	9	(31)	6-12	9	(6)	2-15
niacin (mg)	11	0		0	0.3	(1)	0-0.8	0.6	(2)	0-2	0		0
vitamin B6 (mg)	1.1 if 19-50 1.4 if 50+	32	(59)	25-39	27	(99)	23-32	48	(174)	43-54	62	(45)	51-73
vitamin B12 (µg)	2	11	(20)	6-15	15	(54)	11-19	13	(44)	9-17	10	(7)	3-17
folate (µg)	320	99	(181)	97-100	98	(372)	96-99	97	(347)	95-99	96	(70)	92-100
vitamin C (mg)	60	58	(106)	51-65	58	(218)	53-63	47	(166)	41-52	44	(32)	33-56

[1] adjusted for intra-subject variability; based on food sources only

Source: BBCA E451311-007BV2

Table G.8 Mean Nutrient Intake[1] by Health Region

Mean	EP			WP			Q			SK			EK		
	Estimate	[95% CI]		Estimate	[95% CI]		Estimate	[95% CI]		Estimate	[95% CI]		Estimate	[95% CI]	
perprot	16.0	15.4	16.7	15.8	15.4	16.3	16.6	16.2	16.9	16.9	16.0	17.7	16.5	15.4	17.7
percarb	48.4	47.3	49.5	49.7	48.8	50.6	49.6	48.9	50.3	48.2	46.8	49.5	47.6	45.9	49.4
perlipd	34.3	33.3	35.2	33.0	32.2	33.8	32.6	32.0	33.2	33.9	32.8	35.0	35.5	34.0	37.0
persat	12.4	11.9	12.9	11.3	11.0	11.7	11.9	11.6	12.2	12.1	11.5	12.6	13.1	12.4	13.9
perpoly	5.1	4.8	5.4	5.4	5.2	5.7	5.1	5.0	5.3	5.4	5.0	5.8	5.4	5.0	5.9
permono	14.1	13.6	14.6	13.4	13.0	13.8	12.9	12.6	13.2	13.7	13.1	14.2	14.5	13.8	15.3
cholest	315.3	287.9	342.7	292.8	273.4	312.2	272.4	258.7	286.1	318.7	286.5	350.8	298.9	252.5	345.2
td_fibre	13.7	12.8	14.6	15.1	14.3	15.9	14.8	14.3	15.4	14.9	13.5	16.4	11.6	10.6	12.6
sodium	3002.9	2818.1	3187.7	3076.4	2923.3	3229.6	2798.2	2699.5	2896.8	3071.0	2813.7	3328.4	2656.7	2328.1	2985.4
potassm	3031.6	2855.6	3207.7	3052.0	2907.8	3196.2	2902.8	2817.1	2988.4	3035.1	2803.7	3266.5	2690.8	2479.3	2902.3
calcium	784.2	717.5	850.8	795.1	748.5	841.7	797.6	763.4	831.9	809.2	721.3	897.1	755.6	657.3	853.9
phospho	1330.5	1244.7	1416.3	1316.0	1262.7	1369.2	1288.2	1247.2	1329.2	1375.6	1270.8	1480.4	1168.7	1049.9	1287.5
magnsm	270.5	255.3	285.8	290.1	277.6	302.7	278.7	270.3	287.1	287.2	267.4	307.0	243.5	224.3	262.8
iron	13.9	12.9	14.9	14.9	14.1	15.6	13.4	12.9	13.9	13.9	12.9	14.9	11.9	10.7	13.0
zinc	11.3	10.4	12.2	11.3	10.7	11.9	11.1	10.7	11.5	12.9	10.4	15.4	9.7	8.7	10.8
vit_a	1220.6	1049.4	1391.9	1018.6	921.4	1115.9	1203.7	1106.4	1301.1	1086.4	879.6	1293.2	1244.9	735.3	1754.5
thiamin	1.5	1.4	1.6	1.6	1.5	1.7	1.5	1.4	1.5	1.6	1.4	1.7	1.3	1.2	1.5
riboflv	1.8	1.7	1.9	1.8	1.7	1.9	1.7	1.7	1.8	1.8	1.7	2.0	1.7	1.5	2.0
niacin	37.4	35.2	39.6	37.9	36.3	39.6	36.6	35.3	37.9	39.2	36.3	42.2	34.0	30.3	37.7
vit_b6	1.7	1.6	1.8	1.8	1.7	1.9	1.7	1.6	1.7	1.8	1.6	2.0	1.5	1.4	1.7
vit_b12	8.3	5.7	10.9	7.5	5.5	9.5	6.0	4.9	7.1	7.9	5.1	10.8	6.3	2.7	9.8
pantot	4.9	4.6	5.2	4.9	4.6	5.1	4.6	4.5	4.8	5.1	4.7	5.5	4.6	3.9	5.2
folacin	197.9	186.3	209.6	205.7	194.9	216.5	203.2	194.8	211.7	202.5	186.5	218.4	187.4	167.2	207.5
vit_c	88.3	77.1	99.5	89.0	79.3	98.7	90.6	84.1	97.2	81.8	69.8	93.8	78.7	66.4	90.9
alcohol	4.9	2.7	7.2	5.6	3.9	7.3	4.3	3.1	5.5	3.4	1.8	5.1	0.8	0.2	1.5
caffeine	184.9	158.7	211.1	242.1	188.3	295.9	230.4	214.2	246.5	206.6	174.8	238.3	252.1	167.4	336.8

[1] Intakes based on single day recalls from food sources only

Table G.9 Mean Nutrient Intake[1] by Education

	Elementary			Secondary			Post Secondary		
Mean	Estimate	[95% Confidence Int]		Estimate	[95% Confidence Int]		Estimate	[95% Confidence Int]	
perprot	16.6	16.1	17.0	16.7	16.2	17.1	16.0	15.6	16.3
percarb	48.1	47.3	48.9	48.8	48.0	49.7	50.2	49.6	50.9
perlipd	34.5	33.8	35.2	33.4	32.6	34.1	32.3	31.6	32.9
persat	12.2	11.9	12.6	12.1	11.7	12.4	11.7	11.3	12.0
perpoly	5.5	5.3	5.7	5.2	5.0	5.4	5.2	5.0	5.3
permono	14.0	13.7	14.4	13.5	13.2	13.9	12.8	12.5	13.1
cholest	321.3	301.8	340.8	290.7	273.2	308.2	266.8	252.3	281.2
td_fibre	14.1	13.5	14.7	14.3	13.6	15.0	15.0	14.4	15.7
sodium	2948.3	2810.4	3086.1	2936.8	2805.3	3068.4	2873.5	2762.7	2984.3
potassm	2958.8	2839.6	3077.9	3006.0	2882.2	3129.9	2920.1	2826.0	3014.2
calcium	723.1	685.7	760.4	813.2	764.2	862.2	835.0	796.4	873.6
phospho	1284.6	1231.4	1337.8	1321.7	1265.9	1377.5	1303.6	1260.6	1346.6
magnsm	270.0	259.4	280.6	279.8	268.8	290.9	284.8	275.9	293.7
iron	14.2	13.5	14.9	13.6	13.0	14.2	13.6	13.1	14.0
zinc	11.6	10.9	12.2	11.4	10.9	12.0	11.0	10.2	11.7
vit_a	1273.9	1108.6	1439.2	1076.6	957.4	1195.8	1128.8	1048.1	1209.4
thiamin	1.5	1.5	1.6	1.5	1.4	1.6	1.5	1.4	1.5
riboflv	1.8	1.7	1.8	1.8	1.7	1.9	1.8	1.7	1.8
niacin	37.6	36.0	39.1	37.8	36.2	39.3	36.5	35.0	37.9
vit_b6	1.7	1.6	1.8	1.7	1.6	1.8	1.7	1.6	1.7
vit_b12	9.1	7.0	11.1	6.3	5.0	7.5	5.8	4.6	6.9
pantot	4.9	4.6	5.1	4.8	4.6	5.1	4.6	4.5	4.8
folacin	200.6	192.1	209.0	196.5	186.9	206.2	206.6	197.3	215.8
vit_c	81.4	75.6	87.2	86.9	77.9	95.9	94.2	86.9	101.5
alcohol	3.0	1.9	4.1	4.4	2.7	6.1	5.3	4.1	6.5
caffeine	231.0	190.3	271.7	235.2	204.7	265.6	217.2	200.9	233.5

[1] Intakes based on single day recalls from food sources only

Table G.10 Mean Nutrient Intake[1] by Income Adequacy

Mean	Low			Middle			Upper			Unknown		
	Estimate	[95% CI]		Estimate	[95% CI]		Estimate	[95% CI]		Estimate	[95% CI]	
perprot	14.9	14.3	15.4	16.8	16.3	17.2	16.6	16.2	17.0	16.2	15.7	16.8
percarb	50.3	49.1	51.5	48.5	47.8	49.2	49.4	48.7	50.1	49.2	48.0	50.4
perlipd	34.2	33.2	35.3	33.7	33.1	34.4	32.4	31.8	33.0	33.5	32.5	34.5
persat	12.1	11.6	12.6	12.0	11.7	12.4	11.8	11.4	12.1	12.1	11.5	12.6
perpoly	5.4	5.1	5.8	5.2	5.0	5.4	5.2	5.1	5.4	5.1	4.8	5.4
permono	14.0	13.5	14.5	13.7	13.3	14.0	12.8	12.5	13.1	13.6	13.1	14.2
cholest	275.4	249.2	301.6	296.4	279.2	313.5	290.7	275.1	306.3	285.9	260.0	311.8
td_fibre	14.0	12.9	15.1	14.3	13.7	15.0	14.9	14.4	15.5	14.5	13.5	15.4
sodium	2978.1	2767.7	3188.6	2900.4	2778.6	3022.1	2938.4	2825.6	3051.2	2758.6	2569.4	2947.9
potassm	2754.1	2587.7	2920.6	2947.3	2836.8	3057.9	3018.5	2918.8	3118.2	3021.2	2840.7	3201.6
calcium	738.1	671.0	805.2	812.5	768.7	856.4	813.6	777.2	850.0	745.5	686.5	804.5
phospho	1186.9	1110.1	1263.6	1317.2	1265.8	1368.6	1341.9	1296.4	1387.3	1270.9	1200.3	1341.6
magnsm	254.8	240.1	269.5	276.0	265.8	286.1	290.7	281.3	300.1	277.8	262.7	293.0
iron	12.8	12.0	13.6	13.9	13.3	14.5	14.1	13.5	14.6	13.6	12.7	14.5
zinc	10.0	9.3	10.7	11.3	10.8	11.9	11.3	10.8	11.8	12.5	10.3	14.7
vit_a	1167.0	906.7	1427.2	1093.3	999.1	1187.4	1119.8	1034.1	1205.5	1412.1	1150.3	1673.8
thiamin	1.4	1.3	1.5	1.5	1.4	1.6	1.5	1.5	1.6	1.5	1.4	1.6
riboflv	1.7	1.5	1.8	1.8	1.7	1.9	1.8	1.7	1.9	1.7	1.6	1.9
niacin	33.0	30.9	35.1	37.6	36.1	39.0	38.6	37.1	40.0	36.6	34.5	38.8
vit_b6	1.5	1.4	1.6	1.7	1.6	1.8	1.8	1.7	1.8	1.8	1.7	1.9
vit_b12	6.2	4.3	8.0	6.6	5.1	8.1	7.2	5.7	8.7	7.6	5.5	9.7
pantot	4.5	4.1	4.8	4.8	4.6	5.0	4.8	4.6	5.0	4.8	4.5	5.2
folacin	190.3	176.5	204.2	201.6	193.2	209.9	206.2	196.8	215.6	203.5	190.3	216.8
vit_c	79.3	71.1	87.5	92.6	84.5	100.7	87.1	80.0	94.1	90.8	79.2	102.4
alcohol	1.7	0.6	2.8	3.8	2.6	5.0	6.0	4.5	7.5	4.0	1.8	6.2
caffeine	208.5	148.3	268.6	217.9	189.4	246.3	249.0	226.4	271.5	195.6	164.7	226.5

[1] Intakes based on single day recalls from food sources only

APPENDIX H

List of Figures

Figure 2.1 Survey Data Flow
Figure 2.2 Caloric Intake from Energy: PEI Observed vs. Adjusted
Figure 2.3 Carbohydrate Intake: PEI Observed vs. Adjusted
Figure 2.4 Lipid Intake: PEI Observed vs. Adjusted

Figure 3.1 Response Rates by Age and Sex

Figure 6.1 Body Mass Index
Figure 6.2 Waist Hip Ratio
Figure 6.3 Reported Regular Physical Activity
Figure 6.4 Calculation of Energy Intake to BMR Ratio
Figure 6.5 Possible Under-reporting of Energy Intakes

Figure F.1 Flow of Response Categories

List of Tables

Table 2.1 1995 PEI Population Counts, by age-sex strata

Table 3.1 Results of Sampling by Age-Sex Group, Both Seasons
Table 3.2 Distribution of Interviews by Day of Week
Table 3.3 1995 PEI Population Profile, by age and sex
Table 3.4 Sampling Weights, By Season

Table 4.1 Sample Size by Health Region
Table 4.2 PEI Nutrition Survey Demographic Characteristics
Table 4.3 Income Adequacy

Table 5.1 Nutrient Intakes of PEI Males
Table 5.2 Nutrient Intakes of PEI Females
Table 5.3 Percentiles of Nutrient Intake of PEI Males by Age
Table 5.4 Percentiles of Nutrient Intake of PEI Females by Age
Table 5.5 Nutrient Density of PEI Males
Table 5.6 Nutrient Density of PEI Females
Table 5.7 Nutrient Sources Contributing to Energy Intake
Table 5.8 Comparison of Mean Intakes of Macronutrients with Recommendations
Table 5.9 Distribution of Macronutrient Intakes

Table 5.10 Male Prevalence of Micronutrient Inadequacy
Table 5.11 Female Prevalence of Micronutrient Inadequacy
Table 5.12 Distribution of Calcium Intake
Table 5.13 Distribution of Dietary Fibre Intakes
Table 5.14 Mean Nutrient Intakes in Provincial Nutrition Surveys
Table 5.15 Distribution of Macronutrient and Fibre Intakes in Provincial Nutrition Surveys
Table 5.16 PEI Nutrient Intake in 1995 and 1972

Table 6.1 PEI Body Mass Index, 1995
Table 6.2 PEI Waist Hip Ratio, 1995
Table 6.3 Reported Energy Intake and Estimated Energy Needs by Age and Sex
Table 6.4 Mean Energy and Fat Intake by BMI

Table 7.1 Consumption of Selected Vegetables
Table 7.2 Consumption of Selected Foods from the Meat and Alternatives Group
Table 7.3 Consumption of Selected Milk Products
Table 7.4 Types of Fluid Milk Consumed
Table 7.5 Consumption of Selected Grain Foods

Table 8.1 Beliefs About Actions to Prevent Heart Disease
Table 8.2 Choosing or Avoiding Foods Due to Health Concerns
Table 8.3 Perceived Importance of Health Behaviours
Table 8.4 Choosing or Avoiding Foods Based on Nutrient Content
Table 8.5 Sources of Dietary Information

Table F.1 PEI Accountability Table by Age-sex Group
Table F.2 PEI Response Rates: Lower Bound on Analysis by Age-sex Group
Table F.3 PEI Response Rates: Upper Bound on Analysis by Age-sex Group
Table F.4 Characteristics of Responders and Refusers

Table G.1 Nutrient Intake, by Sex: Means and 95% Confidence Intervals
Table G.2 Nutrient Intake, Males: Medians and 95% Confidence Intervals
Table G.3 Nutrient Intake, Females: Medians and 95% Confidence Intervals
Table G.4 Nutrient Density, Males: Means and 95% Confidence Intervals
Table G.5 Nutrient Density, Females: Means and 95% Confidence Intervals
Table G.6 Micronutrient Inadequacy, Males: % individuals and 95% CI
Table G.7 Micronutrient Inadequacy, Females: % individuals and 95% CI
Table G.8 Mean Nutrient Intake by Health Region
Table G.9 Mean Nutrient Intake by Education
Table G.10 Mean Nutrient Intake by Income Adequacy